

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT				1. CONTRACT ID CODE		PAGE OF PAGES	
2. AMENDMENT/MODIFICATION NO.		3. EFFECTIVE DATE		4. REQUISITION/PURCHASE REQ. NO.		5. PROJECT NO. <i>(If applicable)</i>	
6. ISSUED BY		CODE		7. ADMINISTERED BY <i>(If other than Item 6)</i>		CODE	
8. NAME AND ADDRESS OF CONTRACTOR <i>(No., street, county, State and ZIP Code)</i>				(X)		9A. AMENDMENT OF SOLICITATION NO.	
						9B. DATED <i>(SEE ITEM 11)</i>	
						10A. MODIFICATION OF CONTRACT/ORDER NO.	
						10B. DATED <i>(SEE ITEM 11)</i>	
CODE		FACILITY CODE					

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers
☐ is extended, ☐ is not extended.

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:

(a) By completing items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. **FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER.** If by virtue of this amendment your desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA *(If required)*

**13. THIS ITEM ONLY APPLIES TO MODIFICATION OF CONTRACTS/ORDERS.
IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.**

CHECK ONE	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: <i>(Specify authority)</i> THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES <i>(such as changes in paying office, appropriation date, etc.)</i> SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
	D. OTHER <i>(Specify type of modification and authority)</i>

E. IMPORTANT: Contractor ☐ is not, ☐ is required to sign this document and return _____ copy to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION *(Organized by UCF section headings, including solicitation/contract subject matter where feasible.)*

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER <i>(Type or print)</i>		16A. NAME AND TITLE OF CONTRACTING OFFICER <i>(Type or print)</i>	
15B. CONTRACTOR/OFFEROR		16B. UNITED STATES OF AMERICA	
15C. DATE SIGNED		16C. DATE SIGNED	
<div style="border-top: 1px solid black; width: 100%;"></div> <i>(Signature of person authorized to sign)</i>		<div style="border-top: 1px solid black; width: 100%;"></div> <i>(Signature of Contracting Officer)</i>	

Item 14. Continued.

CHANGES TO THE SPECIFICATIONS

1. New Sections - Add the following accompanying new sections, bearing the notation "ACCOMPANYING AMENDMENT NO. 0004 TO SOLICITATION NO. DACW63-03-B-0001:"

SECTION 10101 MISCELLANEOUS ITEMS
SECTION 10800 TOILET ACCESSORIES

2. Replacement Sections - Replace the following sections with the accompanying new sections of the same number and title, bearing the notation "ACCOMPANYING AMENDMENT NO. 0004 TO SOLICITATION NO. DACW63-03-B-0001:"

SECTION 07416 STRUCTURAL STANDING SEAM METAL ROOF (SSSMR) SYSTEM
SECTION 09915 COLOR SCHEDULE
SECTION 11143 ABOVEGROUND FUEL DISPENSING SYSTEM
SECTION 11300 AUTOMATED FUEL MANAGEMENT SYSTEM
SECTION 11400 INVENTORY CONTROL SYSTEM

CHANGES TO THE DRAWINGS

3. Replacement Drawings - Replace the drawings listed below with the attached new drawings of the same number, bearing the notation "AM #0004".

c3a.cal C-3A SITE GRADING PLAN -BASE BID
c3b.cal C-3B SITE GRADING PLAN -BASE BID & BID OPTIONS 1& 2
c4.cal C-4 SITE UTILITY PLAN- BASE BID
c5b.cal C-5B PLAN & PROFILE NORTH ACCESS DRIVE
c7.cal C-7 SANITARY SEWER PROFILES
a19.cal A19 Elevations with Bid Options
a20.cal A20 Elevations with Bid Options
a27.cal A27 Wall Sections
a29.cal A29 Enlarged Plans & Int. Elev.
a36.cal A36 Wall Details
i07.cal I07 Room Finish Schedule

END OF AMENDMENT

SECTION 07416

STRUCTURAL STANDING SEAM METAL ROOF (SSSMR) SYSTEM
10/98
AMEND #4

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced.
The publications are referred to in the text by basic designation only.

ALUMINUM ASSOCIATION (AA)

AA Design Manual (1994) Aluminum Design Manual: Specification &
Guidelines for Aluminum Structures

Steel Const deleted by AMEND #4

AMERICAN IRON AND STEEL INSTITUTE (AISI)

AISI Cold-Formed Mnl (1996) Cold-Formed Steel Design Manual

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 463/A 463M (1997) Steel Sheet, Aluminum-Coated, by the Hot-Dip
Process

ASTM A 653/A 653M (1998) Steel Sheet, Zinc-Coated (Galvanized) or
Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip
Process

ASTM A 792/A 792M (1997) Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by
the Hot-Dip Process

ASTM B 209 (1996) Aluminum and Aluminum-Alloy Sheet and Plate

ASTM B 209M (1995) Aluminum and Aluminum-Alloy Sheet and Plate
(Metric)

ASTM C 518 (1998) Steady-State Heat Flux Measurements and Thermal
Transmission Properties by Means of the Heat Flow Meter
Apparatus

ASTM C 991 (1998) Flexible Glass Fiber Insulation for
Pre-Engineered Metal Buildings

ASTM C 1177/C 1177M (1996) Glass Mat Gypsum Substrate for Use as Sheathing

ASTM C 1289 (1998) Faced Rigid Cellular Polyisocyanurate Thermal
Insulation Board

ASTM D 522 (1993a) Mandrel Bend Test of Attached Organic Coatings

ASTM D 523 (1989; R 1994) Specular Gloss

ASTM D 610 (1995) Evaluating Degree of Rusting on Painted Steel
Surfaces

ASTM D 714 (1987; R 1994) Evaluating Degree of Blistering of Paints

ASTM D 968 (1993) Abrasion Resistance of Organic Coatings by
Falling Abrasive

ASTM D 1308 (1987; R 1998) Effect of Household Chemicals on Clear
and Pigmented Organic Finishes

ASTM D 1654 (1992) Evaluation of Painted or Coated Specimens
Subjected to Corrosive Environments

ASTM D 2244 (1995) Calculation of Color Differences from
Instrumentally Measured Color Coordinates

ASTM D 2247 (1997) Testing Water Resistance of Coatings in 100%

Relative Humidity

ASTM D 2794	(1993) Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
ASTM D 3359	(1997) Measuring Adhesion by Tape Test
ASTM D 4214	(1998) Evaluating Degree of Chalking of Exterior Paint Films
ASTM D 4397	(1996) Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications
ASTM D 4587	(1991) Conducting Tests on Paint and Related Coatings and Materials Using a Fluorescent UV-Condensation Light- and Water-Exposure Apparatus
ASTM D 5894	(1996) Standard Practice for Cyclic Salt Fog/UV Exposure of Painted Metal, (Alternating Exposures in a Fog/Dry Cabinet and a UV/Condensation Cabinet)
ASTM E 84	(1998e1) Surface Burning Characteristics of Building Materials
ASTM E 96	(1995) Water Vapor Transmission of Materials
ASTM E 1592	(1995) Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)

ASCE 7	(1995) Minimum Design Loads for Buildings and Other Structures
--------	--

STEEL JOIST INSTITUTE (SJI)

SJI Specs & Tables	(1994) Standard Specifications Load Tables and Weight Tables for Steel Joists and Joist Girders
--------------------	---

1.2 GENERAL REQUIREMENTS

The Contractor shall furnish a commercially available roofing system which satisfies all requirements contained herein and has been verified by load testing and independent design analyses to meet the specified design requirements.

1.2.1 Structural Standing Seam Metal Roof (SSSMR) System

The SSSMR system covered under this specification shall include the entire roofing system; the standing seam metal roof panels, fasteners, connectors, roof securement components, and assemblies tested and approved in accordance with ASTM E 1592. In addition, the system shall consist of panel finishes, slip sheet, insulation, vapor retarder, all accessories, components, and trim and all connections with roof panels. This includes roof penetration items such as vents, curbs, skylights; interior or exterior gutters and downspouts; eaves, ridge, hip, valley, rake, gable, wall, or other roof system flashings installed and any other components specified within this contract to provide a weathertight roof system.

1.2.2 Manufacturer

The SSSMR system shall be the product of a manufacturer who has been in the practice of manufacturing and designing SSSMR systems for a period of not less than 3 years and has been involved in at least five projects similar in size and complexity to this project.

1.2.3 Installer

The installer shall be certified by the SSSMR system manufacturer to have experience in installing at least three projects that are of comparable size, scope and complexity as this project for the particular roof system furnished. The installer may be either employed by the manufacturer or be an independent installer.

1.3 DESIGN REQUIREMENTS

The design of the SSSMR system shall be provided by the Contractor as a complete system. Members and connections not indicated on the drawings shall be designed by the Contractor. Roof panels, components, transitions, accessories, and assemblies shall be supplied by the same roofing system manufacturer.

1.3.1 Design Criteria

Design criteria shall be in accordance with ASCE 7.

1.3.2 Dead Loads

The dead load shall be the weight of the SSSMR system. Collateral loads such as sprinklers, mechanical and electrical systems, and ceilings shall not be attached to the panels.

1.3.3 Live Loads

1.3.3.1 Concentrated Loads

The panels and anchor clips shall be capable of supporting a 1335 N concentrated load. The concentrated load shall be applied at the panel midspan and will be resisted by a single standing seam metal roof panel assumed to be acting as a beam. The undeformed shape of the panel shall be used to determine the section properties.

1.3.3.2 Uniform Loads

The panels and concealed anchor clips shall be capable of supporting a minimum uniform live load of 960 Pa.

1.3.4 Roof Snow Loads

The design roof snow loads shall be as shown on the contract drawings.

1.3.5 Wind Loads

The design wind uplift pressure for the roof system shall be as shown on the contract drawings. The design uplift force for each connection assembly shall be that pressure given for the area under consideration, multiplied by the tributary load area of the connection assembly. The safety factor listed below shall be applied to the design force and compared against the ultimate capacity. Prying shall be considered when figuring fastener design loads.

- a. Single fastener in each connection.....3.0
- b. Two or more fasteners in each connection...2.25

1.3.6 Thermal Loads

Roof panels shall be free to move in response to the expansion and contraction forces resulting from a total temperature range of 116 degrees C during the life of the structure.

1.3.7 Framing Members Supporting the SSSMR System

Any additions/revisions to framing members supporting the SSSMR system to accommodate the manufacturer/fabricator's design shall be the Contractor's responsibility and shall be submitted for review and approval. New or revised framing members and their connections shall be designed in accordance with AISI Cold-Formed Mnl. Maximum deflection under applied live load, snow, or wind load shall not exceed 1/180 of the span length.

1.3.8 Roof Panels Design

Steel panels shall be designed in accordance with AISI Cold-Formed Mnl. Aluminum panels shall be designed in accordance with AA Design Manual. The structural section properties used in the design of the panels shall be determined using the unloaded shape of the roof panels. The calculated panel deflection from concentrated loads shall not exceed 1/180 of the span length. The calculated panel deflection under applied live load, snow, or wind load shall not exceed 1/180 times the span length. Deflections shall be based on panels being continuous across three or more supports. Deflection shall be calculated and measured along the major ribs of the panels.

1.3.9 Accessories and Their Fasteners

Accessories and their fasteners shall be capable of resisting the specified design wind uplift forces and shall allow for thermal movement of the roof panel system. Exposed fasteners shall not restrict free movement of the roof panel system resulting from thermal forces. There shall be a minimum of two fasteners per clip. Single fasteners with a minimum diameter of 9 mm will be allowed when the supporting structural members are prepunched or predrilled.

1.4 PERFORMANCE REQUIREMENTS

The SSSMR shall be tested for wind uplift resistance in accordance with ASTM E 1592; SSSMR systems previously tested and approved by the Corps of Engineers' STANDARD TEST METHOD FOR STRUCTURAL PERFORMANCE OF SSMRS BY UNIFORM STATIC AIR PRESSURE DIFFERENCE may be acceptable. Two tests shall be performed. Test 1 shall simulate the edge condition with one end having crosswise restraint and other end free of crosswise restraint. The maximum span length for the edge condition shall be 750 mm. Test 2 shall simulate the interior condition with both ends free of crosswise restraint. The maximum span length for the interior condition shall be 1.5 m. External reinforcement, such as clamps on the ribs, shall not be installed to improve uplift resistance. Bolts through seams shall not be installed.

1.5 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-05 Design Data

Design Analysis; G.

Design analysis signed by a Registered Professional Engineer employed by the SSSMR manufacturer. The design analysis shall include a list of the design loads, and complete calculations for the support system (when provided by the Contractor), roofing system and its components; valley designs, gutter/downspout calculations, screw pullout test results, and shall indicate how expected thermal movements are accommodated.

SD-02 Shop Drawings

Structural Standing Seam Metal Roof System; G.

Metal roofing drawings and specifications and erection drawings; shop coating and finishing specifications; and other data as necessary to clearly describe design, materials, sizes, layouts, standing seam configuration, construction details, provisions for thermal movement, line of panel fixity, fastener sizes and spacings, sealants and erection procedures. Drawings shall reflect the intent of the architectural detailing using the manufacturer's proprietary products and fabricated items as required. The SSSMR system shop drawings shall be provided by the metal roofing manufacturer.

SD-07 Certificates

Qualifications; GA.

Qualifications of the manufacturer and installer.

SD-06 Test Reports

Test Report for Uplift Resistance of the SSSMR; G.

The report shall include the following information:

- a. Details of the SSSMR system showing the roof panel cross-section with dimensions and thickness.
- b. Details of the anchor clip, dimensions, and thickness.
- c. Type of fasteners, size, and the number required for each connection.

Purlins deleted by AMEND #4

- e. Description of the seaming operation including equipment used.
- f. Maximum allowable uplift pressures. These pressures are determined from the ultimate load divided by a factor of safety equal to 1.65.
- g. Any additional information required to identify the SSSMR system tested.
- h. Signature and seal of an independent registered engineer who witnessed the test.

SD-07 Certificates

Structural Standing Seam Metal Roof System; GA.

- a. Certification that the actual thickness of uncoated sheets used in SSSMRs components including roofing panels, subpurlins, and concealed anchor clips complies with specified requirements.

- b. Certification that materials used in the installation are mill certified.
- c. Previous certification of SSSMR system tested under the Corps of Engineers' Standard Test Method in lieu of ASTM E 1592 testing.
- d. Certification that the sheets to be furnished are produced under a continuing quality control program and that a representative sample consisting of not less than three pieces has been tested and has met the quality standards specified for factory color finish.
- e. Certification of installer. Installer certification shall be furnished.
- f. Warranty certificate. At the completion of the project the Contractor shall furnish signed copies of the 5-year Warranty for Structural Standing Seam Metal Roof (SSSMR) System, a sample copy of which is attached to this section, and the 20-year Manufacturer's Material Warranties, and the manufacturer's 20-year system weathertightness warranty.

Insulation; GA.

Certificate attesting that the polyurethane or polyisocyanurate insulation furnished for the project contains recovered material, and showing an estimated percent of such recovered material.

SD-04 Samples

Accessories; GA.

One sample of each type of flashing, trim, closure, thermal spacer block, cap and similar items. Size shall be sufficient to show construction and configuration.

Roof Panels; GA.

One piece of each type to be used, 225 mm long, full width.

Factory Color Finish; GA.

Three 75 by 125 mm samples of each type and color.

Fasteners; GA.

Two samples of each type to be used, with statement regarding intended use. If so requested, random samples of bolts, nuts, and washers as delivered to the job site shall be taken in the presence of the Contracting Officer and provided to the Contracting Officer for testing to establish compliance with specified requirements.

Insulation; GA.

One piece, 300 by 300 mm, of each type and thickness to be used, with a label indicating the rated permeance (if faced) and R-values. The flame spread, and smoke developed rating shall be shown on the label or provided in a letter of certification.

Gaskets and Insulating Compounds; .

Two samples of each type to be used and descriptive data.

Sealant; .

One sample, approximately 0.5 kg, and descriptive data.

Concealed Anchor Clips; .

Two samples of each type used.

Subpurlins; .

One piece, 225 mm long.

EPDM Rubber Boots; .

One piece of each type.

1.6 DELIVERY AND STORAGE

Materials shall be delivered to the site in a dry and undamaged condition and stored out of contact with the ground. Materials shall be covered with weathertight coverings and

kept dry. Storage conditions shall provide good air circulation and protection from surface staining.

1.7 WARRANTIES

The SSSMR system shall be warranted as outlined below. Any emergency temporary repairs conducted by the owner shall not negate the warranties.

1.7.1 Contractor's Weathertightness Warranty

The SSSMR system shall be warranted by the Contractor on a no penal sum basis for a period of five years against material and workmanship deficiencies; system deterioration caused by exposure to the elements and/or inadequate resistance to specified service design loads, water leaks, and wind uplift damage. The SSSMR system covered under this warranty shall include the entire roofing system including, but not limited to, the standing seam metal roof panels, fasteners, connectors, roof securement components, and assemblies tested and approved in accordance with ASTM E 1592. In addition, the system shall consist of panel finishes, slip sheet, insulation, vapor retarder, all accessories, components, and trim and all connections with roof panels. This includes roof penetration items such as vents, curbs, and skylights; interior or exterior gutters and downspouts; eaves, ridge, hip, valley, rake, gable, wall, or other roof system flashings installed and any other components specified within this contract to provide a weathertight roof system; and items specified in other sections of these specifications that are part of the SSSMR system. All material and workmanship deficiencies, system deterioration caused by exposure to the elements and/or inadequate resistance to specified design loads, water leaks and wind uplift damage shall be repaired as approved by the Contracting Officer. See the attached Contractor's required warranty for issue resolution of warrantable defects. This warranty shall warrant and cover the entire cost of repair or replacement, including all material, labor, and related markups. The Contractor shall supplement this warranty with written warranties from the installer and system manufacturer, which shall be submitted along with Contractor's warranty; however, the Contractor shall be ultimately responsible for this warranty. The Contractor's written warranty shall be as outlined in attached WARRANTY FOR STRUCTURAL STANDING SEAM METAL ROOF (SSSMR) SYSTEM, and shall start upon final acceptance of the facility. It is required that the Contractor provide a separate bond in an amount equal to the installed total roofing system cost in favor of the owner (Government) covering the Contractor's warranty responsibilities effective throughout the five year Contractor's warranty period for the entire SSSMR system as outlined above.

1.7.2 Manufacturer's Material Warranties.

The Contractor shall furnish, in writing, the following manufacturer's material warranties which cover all SSSMR system components such as roof panels, anchor clips and fasteners, flashing, accessories, and trim, fabricated from coil material:

a. A manufacturer's 20 year material warranty warranting that the aluminum, zinc-coated steel, aluminum-zinc alloy coated steel or aluminum-coated steel as specified herein will not rupture, structurally fail, fracture, deteriorate, or become perforated under normal design atmospheric conditions and service design loads. Liability under this warranty shall be limited exclusively to the cost of either repairing or replacing nonconforming, ruptured, perforated, or structurally failed coil material.

b. A manufacturer's 20 year exterior material finish warranty on the factory colored finish warranting that the finish, under normal atmospheric conditions at the site, will not crack, peel, or delaminate; chalk in excess of a numerical rating of eight, as determined by ASTM D 4214 test procedures; or change color in excess of five CIE or Hunter Lab color difference (delta E) units in accordance with ASTM D 2244. Liability under this warranty is exclusively limited to refinishing with an air-drying version of the specified finish or replacing the defective coated material.

c. A roofing system manufacturer's 20 year system weathertightness warranty.

1.8 COORDINATION MEETING

A coordination meeting shall be held within 45 days after contract award for mutual understanding of the Structural Standing Seam Metal Roof (SSSMR) System contract requirements. This meeting shall take place at the building site and shall include representatives from the Contractor, the roof system manufacturer, the roofing supplier, the erector, the designer, and the Contracting Officer. All items required by paragraph SUBMITTALS shall be discussed, including applicable standard manufacturer shop drawings, and the approval process. The Contractor shall coordinate time and arrangements for the meeting.

PART 2 PRODUCTS

2.1 ROOF PANELS

Panels shall be steel and shall have a factory color finish. Length of sheets shall be sufficient to cover the entire length of any unbroken roof slope for slope lengths that do not exceed 9 m. When length of run exceeds 9 m and panel laps are provided, each sheet in the run shall extend over three or more supports. Sheets longer than 30 m may be furnished if approved by the Contracting Officer. Width of sheets shall provide not more than 600 mm of coverage in place. SSSMR system with roofing panels greater than 300 mm in width shall have standing seams rolled during installation by an electrically driven seaming machine. Height of standing seams shall be not less than 37 mm for rolled seam and 30 mm for seams that are not rolled.

2.1.1 Steel Panels

Steel panels shall be zinc-coated steel conforming to ASTM A 653/A 653M; aluminum-zinc alloy coated steel conforming to ASTM A 792/A 792M, AZ 55 coating; or aluminum-coated steel conforming to ASTM A 463/A 463M, Type 2, coating designation T2 65. Uncoated panels shall be 0.6 mm thick minimum. Panels shall be within 95 percent of nominal thickness. Prior to shipment, mill finish panels shall be treated with a passivating chemical to inhibit the formation of oxide corrosion products. Panels that have become wet during shipment and have started to oxidize shall be rejected.

2.1.2 Aluminum Panels

Alloy conforming to ASTM B 209M, temper as required for the forming operation, minimum 0.8 mm thick.

2.2 CONCEALED ANCHOR CLIPS

Concealed anchor clips shall be the same as the tested roofing system. Clip bases shall have factory punched or drilled holes for attachment. Clips shall be made from multiple pieces with the allowance for the total thermal movement required to take place within the clip. Single piece clips may be acceptable when the manufacturer can substantiate that the system can accommodate the thermal cyclic movement under sustained live or snow loads.

2.3 ACCESSORIES

Flashing, trim, metal closure strips, caps and similar metal accessories shall be the manufacturer's standard products. Exposed metal accessories shall be finished to match the panels furnished. Molded closure strips shall be bituminous-saturated fiber, closed-cell or solid-cell synthetic rubber or neoprene, or polyvinyl chloride premolded to match configuration of the panels and shall not absorb or retain water. Die cast metal closures shall be installed with double bead tape sealant and fasteners that stitch the panel to a 2 mm preformed backer plate to ensure a positive compression of the tape sealant. The use of a continuous angle butted to the panel ends to form a closure will not be allowed.

2.4 FASTENERS

Fasteners for steel roof panels shall be zinc-coated steel, aluminum, corrosion resisting steel, or nylon capped steel, type and size specified below or as otherwise approved for the applicable requirements. Fasteners for aluminum roof panels shall be aluminum or corrosion resisting steel. Fasteners for structural connections shall provide both tensile and shear ultimate strengths of not less than 3340 N per fastener. Fasteners for accessories shall be the manufacturer's standard. Exposed roof fasteners shall be sealed or have sealed washers on the exterior side of the roof to waterproof the fastener penetration. Washer material shall be compatible with the roofing; have a minimum diameter of 10 mm for structural connections; and gasketed portion of fasteners or washers shall be neoprene or other equally durable elastomeric material approximately 3 mm thick. Exposed fasteners for factory color finished panels shall be factory finished to match the color of the panels.

2.4.1 Screws

Screws for attaching anchor devices shall be not less than No. 14. Actual screw pull out test results shall be performed for the actual material gage and yield strength of the structural purlins or subpurlins to which the clip is to be anchored/attached. Other screws shall be as recommended by the manufacturer to meet the strength design requirements of the panels.

2.4.2 Bolts

Bolts shall be not less than 6 mm diameter, shouldered or plain shank as required, with locking washers and nuts.

2.4.3 Structural Blind Fasteners

Blind screw-type expandable fasteners shall be not less than 6 mm diameter. Blind (pop) rivets shall be not less than 7 mm minimum diameter.

Sub-purlins deleted by AMEND #4

2.5 AMEND #4FACTORY COLOR FINISH

Panels shall have a factory applied polyvinylidene fluoride finish on the exposed side. The exterior finish shall consist of a baked-on topcoat with an appropriate prime coat. Color shall match the color indicated in Section 09915 COLOR SCHEDULE. **The exterior coating shall be a nominal 0.025 mm thickness consisting of a topcoat of not less than 0.018 mm dry film thickness and the paint manufacturer's recommended primer of not less than 0.005 mm. The interior color finish shall consist of the same coating, dry film and primer thickness as the exterior coat.** The exterior color finish shall meet the test requirements specified below.

2.5.1 Salt Spray Test

A sample of the sheets shall withstand a cyclic corrosion test for a minimum of 2016 hours in accordance with ASTM D 5894, including the scribe requirement in the test. Immediately upon removal of the panel from the test, the coating shall receive a rating of not less than 10, no blistering, as determined by ASTM D 714; 10, no rusting, as determined by ASTM D 610; and a rating of 6, over 2.0 to 3.0 mm failure at scribe, as determined by ASTM D 1654.

2.5.2 Formability Test

When subjected to testing in accordance with ASTM D 522 Method B, 3 mm diameter mandrel, the coating film shall show no evidence of cracking to the naked eye.

2.5.3 Humidity Test

When subjected to a humidity cabinet test in accordance with ASTM D 2247 for 1000 hours, a scored panel shall show no signs of blistering, cracking, creepage or corrosion.

2.5.4 Impact Resistance

Factory-painted sheet shall withstand direct and reverse impact in accordance with ASTM D 2794 13 mm diameter hemispherical head indenter, equal to 6.7 times the metal thickness in mm, expressed in Newton-meters, with no cracking.

2.5.5 Abrasion Resistance Test

When subjected to the falling sand test in accordance with ASTM D 968, Method A, the coating system shall withstand a minimum of 80 liters of sand before the appearance of the base metal. The term "appearance of base metal" refers to the metallic coating on steel or the aluminum base metal.

2.5.6 Specular Gloss

Finished roof surfaces shall have a specular gloss value of 10 or less at an angle of 85 degrees when measured in accordance with ASTM D 523.

2.5.7 Pollution Resistance

Coating shall show no visual effects when covered spot tested in a 10 percent hydrochloric acid solution for 24 hours in accordance with ASTM D 1308.

2.6 INSULATION

Thermal resistance of insulation shall be not less than the R-values shown on the contract drawings. R-values shall be determined at a mean temperature of 24 degrees C in accordance with ASTM C 518. Insulation shall be a standard product with the insulation manufacturer, factory marked or identified with insulation manufacturer's name or trademark and R-value. Identification shall be on individual pieces or individual packages. Blanket insulation shall have a facing as specified in paragraph VAPOR RETARDER. Insulation shall have a flame spread not in excess of 25 and a smoke developed rating not in excess of 25 when tested in accordance with ASTM E 84. The stated R-value of the insulation shall be certified by an independent Registered Professional Engineer if tests are conducted in the insulation manufacturer's laboratory.

2.6.1 Polyisocyanurate Rigid Board Insulation for Use Above a Roof Deck

Polyisocyanurate insulation shall conform to ASTM C 1289, Type II, (having a minimum recovered material content of 9 percent by weight of core material in the polyisocyanurate portion). For polyisocyanurate, the maximum design R-value per 25 mm

of insulation used shall be 1.27. Facings shall be non-asphaltic, glass fiber reinforced.

2.6.2 Blanket Insulation

Blanket insulation shall conform to ASTM C 991.

2.6.3 Glass Mat Gypsum Roof Board

Glass mat gypsum roof board for use above the deck or insulation for thermal protection shall have a flame spread - 0, smoke developed - 0, shall be water resistant and have a compressive strength of 3.4 kpa . Glass mat gypsum roof board shall conform to ASTM C 1177/C 1177M.

2.7 INSULATION RETAINERS

Insulation retainers shall be type, size, and design necessary to adequately hold the insulation and to provide a neat appearance. Metallic retaining members shall be nonferrous or have a nonferrous coating. Nonmetallic retaining members, including adhesives used in conjunction with mechanical retainers or at insulation seams, shall have a fire resistance classification not less than that permitted for the insulation.

2.8 SEALANT

Sealants shall be elastomeric type containing no oil or asphalt. Exposed sealant shall be colored to match the applicable building color and shall cure to a rubberlike consistency. Sealant placed in the roof panel standing seam ribs shall be provided in accordance with the manufacturer's recommendations.

2.9 GASKETS AND INSULATING COMPOUNDS

Gaskets and insulating compounds shall be nonabsorptive and suitable for insulating contact points of incompatible materials. Insulating compounds shall be nonrunning after drying.

2.10 VAPOR RETARDER

2.10.1 Vapor Retarders as Integral Facing

Insulation facing shall have a permeability of 1.15 ng per Pa-second-square meter or less when tested in accordance with ASTM E 96. Facing shall be white sheet vinyl . Facings and finishes shall be factory applied.

2.10.2 Vapor Retarders Separate from Insulation

Vapor retarder material shall be polyethylene sheeting conforming to ASTM D 4397. A single ply of 0.25 mm polyethylene sheet; or, at the Contractor's option, a double ply of 0.15 mm polyethylene sheet shall be used. A fully compatible polyethylene tape which has equal or better water vapor control characteristics than the vapor retarder material shall be provided. A cloth industrial duct tape in a utility grade shall also be provided to use as needed to protect the vapor retarder from puncturing.

2.10.3 Slip Sheet for Use With Vapor Retarder

Slip sheet for use with vapor retarder shall be a 0.24 kg per square meter rosin-sized, unsaturated building paper.

2.11 EPDM RUBBER BOOTS

Flashing devices around pipe penetrations shall be flexible, one-piece devices molded from weather-resistant EPDM rubber. Rubber boot material shall be as recommended by the manufacturer. The boots shall have base rings made of aluminum or corrosion resisting steel that conform to the contours of the roof panel to form a weather-tight seal.

2.12 PREFABRICATED CURBS AND EQUIPMENT SUPPORTS

Prefabricated curbs and equipment supports shall be of structural quality, hot-dipped galvanized or galvanized sheet steel, factory primed and prepared for painting with mitered and welded joints. Integral base plates and water diverter crickets shall be provided. Minimum height of curb shall be 200 mm above finish roof. Curbs shall be constructed to match roof slope and to provide a level top surface for mounting of equipment. Curb flange shall be constructed to match configuration of roof panels. Curb size shall be coordinated, prior to curb fabrication, with the mechanical equipment to be supported. Strength requirements for equipment supports shall be coordinated to include all anticipated loads. Flashings shall not be rigidly attached to underline structure.

PART 3 EXECUTION

3.1 INSTALLATION

Installation shall be in accordance with the manufacturer's erection instructions and drawings. Dissimilar materials which are not compatible when contacting each other shall be insulated by means of gaskets or insulating compounds. Molded closure strips shall be installed wherever roofing sheets terminate in open-end configurations, exclusive of flashings. The closure strip installation shall be weather-tight and sealed. Screws shall be installed with a clutching screw gun, to assure screws are not stripped. Field test shall be conducted on each gun prior to starting installation and periodically thereafter to assure it is adjusted properly to install particular type and size of screw as recommended by manufacturer's literature. Improper or mislocated drill holes shall be plugged with an oversize screw fastener and gasketed washer; however, sheets with an excess of such holes or with such holes in critical locations shall not be used. Exposed surfaces and edges shall be kept clean and free from sealant, metal cuttings, hazardous burrs, and other foreign material. Stained, discolored, or damaged sheets shall be removed from the site.

3.1.1 Field Forming of Panels for Unique Area

When roofing panels are formed from factory-color-finished steel coils at the project site, the same care and quality control measures that are taken in shop forming of roofing panels shall be observed. Rollformer shall be operated by the metal roofing manufacturer's representative. In cold weather conditions, preheating of the steel coils to be field formed shall be performed as necessary just prior to the rolling operations.

3.1.2 Subpurlins

Unless otherwise shown, subpurlins shall be anchored to the purlins or other structural framing members with bolts or screws. Attachment to the substrate (when provided) or to the panels is not permitted. The subpurlin spacing shall not exceed 750 mm on centers at the corner, edge and ridge zones, and 1500 mm maximum on centers for the remainder of the roof. Corner, edge, and ridge zones are as defined in ASCE 7.

3.1.3 Roof Panel Installation

Roof panels shall be installed with the standing seams in the direction of the roof slope. The side seam connections for installed panels shall be completed at the end of each day's work. Method of applying joint sealant shall conform to the manufacturer's recommendation to achieve a complete weather-tight installation. End laps of panels shall be provided in accordance with the manufacturer's instructions. Closures, flashings, EPDM rubber boots, roof curbs, and related accessories shall be installed according to the manufacturer's drawings. Fasteners shall not puncture roofing sheets except as provided for in the manufacturer's instructions for erection and installation. Expansion joints for the standing seam roof system shall be installed at locations indicated on the contract drawings and other locations indicated on the manufacturer's drawings.

3.1.4 Concealed Anchor Clips

Concealed anchor clips shall be fastened directly to the structural framing members. Attachment to the substrate (when provided) or to the metal deck is not permitted. The maximum distance, parallel to the seams, between clips shall be 750 mm on center at the corner, edge, and ridge zones, and 1500 mm maximum on centers for the remainder of the roof.

3.2 INSULATION INSTALLATION

Insulation shall be continuous over entire roof surface. Where expansion joints, terminations, and other connections are made, the cavity shall be filled with batt insulation with vapor retarder providing equivalent R-value and perm rating as remaining insulation. Insulation shall be installed as indicated and in accordance with manufacturer's instructions.

3.2.1 Board Insulation with Blanket Insulation

Rigid or semirigid board insulation shall be laid in close contact. Board shall be attached to the metal roof deck with bearing plates and fasteners, as recommended by the insulation manufacturer, so that the insulation joints are held tight against each other, and shall have a minimum of 1 fastener per 0.37 square meters. Layout and joint pattern of insulation and fasteners shall be indicated on the shop drawings. If more than one layer of insulation is required, joints in the second layer shall be offset from joints in the first layer. A layer of blanket insulation shall be placed over the rigid or semirigid board insulation to be compressed against the underside of the metal roofing to reduce thermal bridging, dampen noise, and prevent roofing flutter. This

layer of blanket insulation shall be compressed a minimum of 50 percent.

3.2.2 Blanket Insulation

Blanket insulation shall be installed between and parallel to the purlins with tabs of a facer lapping on the top face of the purlins. Thermal blocks shall be provided over purlins, between clips. A second layer of unfaced insulation shall be added between purlins to provide full R-value. Blanket insulation shall be supported by an integral facing or other commercially available support system.

3.3 PROTECTION OF VAPOR RETARDER FROM ROOF DECK

A cloth industrial duct tape shall be applied over the seams of metal roof decks, at penetration edges, and at surface areas exhibiting sharp burrs or similar protrusions. For other types of roof decks, cloth industrial duct tape shall be applied over irregularities which could potentially puncture polyethylene membrane.

3.4 VAPOR RETARDER INSTALLATION

3.4.1 Integral Facing on Blanket Insulation

Integral facing on blanket insulation shall have the facing lapped and sealed with a compatible tape to provide a vapor tight membrane.

3.4.2 Polyethylene Vapor Retarder

The polyethylene vapor retarder membrane shall be installed over the entire surface. A fully compatible polyethylene tape shall be used to seal the edges of the sheets to provide a vapor tight membrane. Sheet edges shall be lapped not less than 150 mm. Sufficient material shall be provided to avoid inducing stresses in the sheets due to stretching or binding. All tears or punctures that are visible in the finished surface at any time during the construction process shall be sealed with polyethylene tape.

3.5 SLIP SHEET INSTALLATION

A slip sheet shall be laid over the blanket insulation facing to prevent the vinyl facing from adhering to the metal roofing.

3.6 CLEANING AND TOUCH-UP

Exposed SSSMR systems shall be cleaned at completion of installation. Debris that could cause discoloration and harm to the panels, flashings, closures and other accessories shall be removed. Grease and oil films, excess sealants, and handling marks shall be removed and the work shall be scrubbed clean. Exposed metal surfaces shall be free of dents, creases, waves, scratch marks, and solder or weld marks. Immediately upon detection, abraded or corroded spots on shop-painted surfaces shall be wire brushed and touched up with the same material used for the shop coat. Factory color finished surfaces shall be touched up with the manufacturer's recommended touch up paint.

CONTRACTOR'S FIVE (5) YEAR NO PENAL SUM WARRANTY
FOR
STRUCTURAL STANDING SEAM METAL ROOF (SSSMR) SYSTEM

FACILITY DESCRIPTION _____

BUILDING NUMBER: _____

CORPS OF ENGINEERS CONTRACT NUMBER: _____

CONTRACTOR

CONTRACTOR: _____

ADDRESS: _____

POINT OF CONTACT: _____

TELEPHONE NUMBER: _____

OWNER

OWNER: _____

ADDRESS: _____

POINT OF CONTACT: _____

TELEPHONE NUMBER: _____

CONSTRUCTION AGENT

CONSTRUCTION AGENT: _____

ADDRESS: _____

POINT OF CONTACT: _____

TELEPHONE NUMBER: _____

CONTRACTOR'S FIVE (5) YEAR NO PENAL SUM WARRANTY
FOR
STRUCTURAL STANDING SEAM METAL ROOF (SSSMR) SYSTEM
(continued)

THE SSSMR SYSTEM INSTALLED ON THE ABOVE NAMED BUILDING IS WARRANTED BY _____ FOR A PERIOD OF FIVE (5) YEARS AGAINST WORKMANSHIP AND MATERIAL DEFICIENCIES, WIND DAMAGE, STRUCTURAL FAILURE, AND LEAKAGE. THE SSSMR SYSTEM COVERED UNDER THIS WARRANTY SHALL INCLUDE, BUT SHALL NOT BE LIMITED TO, THE FOLLOWING: THE ENTIRE ROOFING SYSTEM, MANUFACTURER SUPPLIED FRAMING AND STRUCTURAL MEMBERS, METAL ROOF PANELS, FASTENERS, CONNECTORS, ROOF SECUREMENT COMPONENTS, AND ASSEMBLIES TESTED AND APPROVED IN ACCORDANCE WITH ASTM E 1592. IN ADDITION, THE SYSTEM PANEL FINISHES, SLIP SHEET, INSULATION, VAPOR RETARDER, ALL ACCESSORIES, COMPONENTS, AND TRIM AND ALL CONNECTIONS ARE INCLUDED. THIS INCLUDES ROOF PENETRATION ITEMS SUCH AS VENTS, CURBS, SKYLIGHTS; INTERIOR OR EXTERIOR GUTTERS AND DOWNSPOUTS; EAVES, RIDGE, HIP, VALLEY, RAKE, GABLE, WALL, OR OTHER ROOF SYSTEM FLASHINGS INSTALLED AND ANY OTHER COMPONENTS SPECIFIED WITHIN THIS CONTRACT TO PROVIDE A WEATHERTIGHT ROOF SYSTEM; AND ITEMS SPECIFIED IN OTHER SECTIONS OF THE SPECIFICATIONS THAT ARE PART OF THE SSSMR SYSTEM.

ALL MATERIAL DEFICIENCIES, WIND DAMAGE, STRUCTURAL FAILURE, AND LEAKAGE ASSOCIATED WITH THE SSSMR SYSTEM COVERED UNDER THIS WARRANTY SHALL BE REPAIRED AS APPROVED BY THE CONTRACTING OFFICER. THIS WARRANTY SHALL COVER THE ENTIRE COST OF REPAIR OR REPLACEMENT, INCLUDING ALL MATERIAL, LABOR, AND RELATED MARKUPS. THE ABOVE REFERENCED WARRANTY COMMENCED ON THE DATE OF FINAL ACCEPTANCE ON _____ AND WILL REMAIN IN EFFECT FOR STATED DURATION FROM THIS DATE.

SIGNED, DATED, AND NOTARIZED (BY COMPANY PRESIDENT)

(Company President)

(Date)

CONTRACTOR'S FIVE (5) YEAR NO PENAL SUM WARRANTY
FOR
STRUCTURAL STANDING SEAM METAL ROOF (SSSMR) SYSTEM
(continued)

THE CONTRACTOR SHALL SUPPLEMENT THIS WARRANTY WITH WRITTEN WARRANTIES FROM THE MANUFACTURER AND/OR INSTALLER OF THE SSSMR SYSTEM, WHICH SHALL BE SUBMITTED ALONG WITH THE CONTRACTOR'S WARRANTY. HOWEVER, THE CONTRACTOR WILL BE ULTIMATELY RESPONSIBLE FOR THIS WARRANTY AS OUTLINED IN THE SPECIFICATIONS AND AS INDICATED IN THIS WARRANTY EXAMPLE.

EXCLUSIONS FROM COVERAGE

1. NATURAL DISASTERS, ACTS OF GOD (LIGHTNING, FIRE, EXPLOSIONS, SUSTAINED WIND FORCES IN EXCESS OF THE DESIGN CRITERIA, EARTHQUAKES, AND HAIL).
2. ACTS OF NEGLIGENCE OR ABUSE OR MISUSE BY GOVERNMENT OR OTHER PERSONNEL, INCLUDING ACCIDENTS, VANDALISM, CIVIL DISOBEDIENCE, WAR, OR DAMAGE CAUSED BY FALLING OBJECTS.
3. DAMAGE BY STRUCTURAL FAILURE, SETTLEMENT, MOVEMENT, DISTORTION, WARPAGE, OR DISPLACEMENT OF THE BUILDING STRUCTURE OR ALTERATIONS MADE TO THE BUILDING.
4. CORROSION CAUSED BY EXPOSURE TO CORROSIVE CHEMICALS, ASH OR FUMES GENERATED OR RELEASED INSIDE OR OUTSIDE THE BUILDING FROM CHEMICAL PLANTS, FOUNDRIES, PLATING WORKS, KILNS, FERTILIZER FACTORIES, PAPER PLANTS, AND THE LIKE.
5. FAILURE OF ANY PART OF THE SSSMR SYSTEM DUE TO ACTIONS BY THE OWNER TO INHIBIT FREE DRAINAGE OF WATER FROM THE ROOF AND GUTTERS AND DOWNSPOUTS OR ALLOW PONDING WATER TO COLLECT ON THE ROOF SURFACE. CONTRACTOR'S DESIGN SHALL INSURE FREE DRAINAGE FROM THE ROOF AND NOT ALLOW PONDING WATER.
6. THIS WARRANTY APPLIES TO THE SSSMR SYSTEM. IT DOES NOT INCLUDE ANY CONSEQUENTIAL DAMAGE TO THE BUILDING INTERIOR OR CONTENTS WHICH IS COVERED BY THE WARRANTY OF CONSTRUCTION CLAUSE INCLUDED IN THIS CONTRACT.
7. THIS WARRANTY CANNOT BE TRANSFERRED TO ANOTHER OWNER WITHOUT WRITTEN CONSENT OF THE CONTRACTOR; AND THIS WARRANTY AND THE CONTRACT PROVISIONS WILL TAKE PRECEDENCE OVER ANY CONFLICTS WITH STATE STATUTES.

**

CONTRACTOR'S FIVE (5) YEAR NO PENAL SUM WARRANTY
FOR
STRUCTURAL STANDING SEAM METAL ROOF (SSSMR) SYSTEM
(continued)

**REPORTS OF LEAKS AND SSSMR SYSTEM DEFICIENCIES SHALL BE RESPONDED TO WITHIN 48 HOURS OF RECEIPT OF NOTICE, BY TELEPHONE OR IN WRITING, FROM EITHER THE OWNER OR CONTRACTING OFFICER. EMERGENCY REPAIRS TO PREVENT FURTHER ROOF LEAKS SHALL BE INITIATED IMMEDIATELY; A WRITTEN PLAN SHALL BE SUBMITTED FOR APPROVAL TO REPAIR OR REPLACE THIS SSSMR SYSTEM WITHIN SEVEN (7) CALENDAR DAYS. ACTUAL WORK FOR PERMANENT REPAIRS OR REPLACEMENT SHALL BE STARTED WITHIN 30 DAYS AFTER RECEIPT OF NOTICE, AND COMPLETED WITHIN A REASONABLE TIME FRAME. IF THE CONTRACTOR FAILS TO ADEQUATELY RESPOND TO THE WARRANTY PROVISIONS, AS STATED IN THE CONTRACT AND AS CONTAINED HEREIN, THE CONTRACTING OFFICER MAY HAVE THE SSSMR SYSTEM REPAIRED OR REPLACED BY OTHERS AND CHARGE THE COST TO THE CONTRACTOR.

IN THE EVENT THE CONTRACTOR DISPUTES THE EXISTENCE OF A WARRANTABLE DEFECT, THE CONTRACTOR MAY CHALLENGE THE OWNER'S DEMAND FOR REPAIRS AND/OR REPLACEMENT DIRECTED BY THE OWNER OR CONTRACTING OFFICER EITHER BY REQUESTING A CONTRACTING OFFICER'S DECISION UNDER THE CONTRACT DISPUTES ACT, OR BY REQUESTING THAT AN ARBITRATOR RESOLVE THE ISSUE. THE REQUEST FOR AN ARBITRATOR MUST BE MADE WITHIN 48 HOURS OF BEING NOTIFIED OF THE DISPUTED DEFECTS. UPON BEING INVOKED, THE PARTIES SHALL, WITHIN TEN (10) DAYS, JOINTLY REQUEST A LIST OF FIVE (5) ARBITRATORS FROM THE FEDERAL MEDIATION AND CONCILIATION SERVICE. THE PARTIES SHALL CONFER WITHIN TEN (10) DAYS AFTER RECEIPT OF THE LIST TO SEEK AGREEMENT ON AN ARBITRATOR. IF THE PARTIES CANNOT AGREE ON AN ARBITRATOR, THE CONTRACTING OFFICER AND THE PRESIDENT OF THE CONTRACTOR'S COMPANY WILL STRIKE ONE (1) NAME FROM THE LIST ALTERNATIVELY UNTIL ONE (1) NAME REMAINS. THE REMAINING PERSON SHALL BE THE DULY SELECTED ARBITRATOR. THE COSTS OF THE ARBITRATION, INCLUDING THE ARBITRATOR'S FEE AND EXPENSES, COURT REPORTER, COURTROOM OR SITE SELECTED, ETC., SHALL BE BORNE EQUALLY BETWEEN THE PARTIES. EITHER PARTY DESIRING A COPY OF THE TRANSCRIPT SHALL PAY FOR THE TRANSCRIPT. A HEARING WILL BE HELD AS SOON AS THE PARTIES CAN MUTUALLY AGREE. A WRITTEN ARBITRATOR'S DECISION WILL BE REQUESTED NOT LATER THAN 30 DAYS FOLLOWING THE HEARING. THE DECISION OF THE ARBITRATOR WILL NOT BE BINDING; HOWEVER, IT WILL BE ADMISSIBLE IN ANY SUBSEQUENT APPEAL UNDER THE CONTRACT DISPUTES ACT.

A FRAMED COPY OF THIS WARRANTY SHALL BE POSTED IN THE MECHANICAL ROOM OR OTHER APPROVED LOCATION DURING THE ENTIRE WARRANTY PERIOD.

-- End of Section --

SECTION 09915

COLOR SCHEDULE
06/93
AMENDMENT 0004

PART 1 GENERAL

1.1 GENERAL

This section covers only the color of the exterior and interior materials and products that are exposed to view in the finished construction. The word "color" as used herein includes surface color and pattern. Requirements for quality and method of installation are covered in other appropriate sections of the specifications. Specific locations where the various materials are required are shown on the drawings. Items not designated for color in this section may be specified in other sections. When color is not designated for items, the Contractor shall propose a color for approval.

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-04 Samples

Color board; G.

Three (3) sets of color boards, 60 days after the Contractor is given Notice to proceed, complying with the following requirements:

- a. Color boards shall reflect all actual finish textures, patterns, and colors required for this contract.
- b. Materials shall be labeled with the finish type, manufacturer's name, pattern, and color reference.
- c. Samples shall be on size A4 or 8-1/2 by 11 inch boards with a maximum spread of size A1 or 25-1/2 by 33 inches for foldouts.
- d. Samples for this color board are required in addition to samples requested in other specification sections.
- e. Color boards shall be submitted to the following for approval:
ARCHITECTURAL SECTION
DESIGN BRANCH
FORT WORTH DISTRICT

PART 2 PRODUCTS

2.1 REFERENCE TO MANUFACTURER'S COLOR

Where color is shown as being specific to one manufacturer, an equivalent color by another manufacturer may be submitted for approval. Manufacturers and materials specified are not intended to limit the selection of equal colors from other manufacturers.

2.2 COLOR SCHEDULE

The color schedule lists the colors, patterns and textures required for exterior and interior finishes, including both factory applied and field applied colors.

2.2.1 Exterior Walls

Exterior wall colors shall apply to exterior wall surfaces including recesses at entrances and projecting vestibules. Conduit shall be painted to closely match the adjacent surface color. Wall color shall be provided to match the colors listed below.

- a. Stone: Austin, White
- b. Mortar: Standard
- c. Wood: Treated Cedar
- d. Cermic Tile (Band): Dal-tile; Natural Hues, Raven, 100x100mm

- f. Insulation and Finish System:
 - EIFS 1; STO 20-701 (Below Band)
 - EIFS 2; STO 20-923 (Above Band)

2.2.2 Exterior Trim

Exterior trim shall be provided to match the colors listed below.

- a. Doors and Door Frames:
 - Manufacturer's Standard Factory Finished Med. Bronze
- b. Windows (mullion, muntin, sash, trim, and sill):
 - Manufacturer's Standard Factory Finished Med. Bronze
- e. Louvers, and Flashings:
 - Walls; Match Adjacent Finish
 - Roof; Match SSMR, MBIC, Signature 300, Sandstone Metallic
- f. Handrails:
 - Painted to match Sherwin Williams, Clay Pot SW2917
- j. Caulking and Sealants:
 - Match Adjacent Finish

2.2.3 Exterior Roof

Roof color shall apply to exterior roof surfaces including sheet metal flashings and copings, mechanical units, roof trim, pipes, conduits, electrical appurtenances, and similar items. Roof color shall be provided to match the colors listed below.

- a. Metal: MBCI; Signature 300, Sandstone Metallic

2.2.4 Interior Floor Finishes

Flooring materials shall be provided to match the colors listed below.

- b. Carpet Tile:
 - F101: Interface; Theorem, Number 1478 w/GlasBacRE
- c. Vinyl Composition Tile:
 - F201: Armstrong; Standard Excelon, Silver Green 51802
 - F202: Armstrong; Standard Excelon, Sandrift White 51858

Note: To be installed in a checker board pattern at a 45 degree angle.

- i. Porcelain Tile:

F401: Dal-tile; Gold Rush, Golden Nugget 5208, Abrasive 300x300mm

Note: Tile to be installed at a 45 degree angle.

j. Grout:

AM4For F401; Mapei; **IVORY/MARFILL 39**

Note: Grout to be sealed with Dominion Penetrating Concrete Sealer.

k. Access Flooring w/Plastic Laminate:

F801: Interface, CTEC/ Nevamar ST-2-2 Beige Starlite

n. Concrete:

F601: With Hardner

F701: With Sealer/Abrasive

2.2.5 Interior Base Finishes

Base materials shall be provided to match the colors listed below.

a. Resilient Base

B101: Johnsonite; Heather Green 59, 100mm

B102: Johnsonite; Zephyr 31, 100mm

d. Porcelain Tile:

B301: Dal-tile; Gold Rush, Golden Nugget P4612 150x300mm

e. Grout:

For B3501; Mapei; Chamois 05

Note: Grout to be sealed with Dominion Penetrating Concrete Sealer

2.2.6 Interior Wall Finishes

Interior wall color shall apply to the entire wall surface, including reveals, vertical furred spaces, grilles, diffusers, electrical and access panels, and piping and conduit adjacent to wall surfaces unless otherwise specified. Items not specified in other paragraphs shall be painted to match adjacent wall surface. Wall materials shall be provided to match the colors listed below.

a. Paint:

W101: Sherwin Williams; Studio Blue Greem 0047

W102: Sherwin Williams; Decorous Amber 0007

W103: Sherwin Williams; Renwick Beige 2805

W104: Sherwin Williams; Bold Brick 6327

W701: Sherwin Williams; Renwick Beige 2805

- f. Porcelain Tile:
W401: Dal-tile; Gold Rush, Golden Nugget 5208, 300x300mm
W402: Dal-tile; Gold Rush, Golden Nugget 5208, 150x300mm
AM04; DAL-TILE; GOLD RUSH, GOLDEN NUGGETT 5209, 150X150MM
*NOTE: See Arch. Drwgs for pattern.

- g. Porcelain Tile Grout:
For W401, W402, **AM4 W403**: Mapei; Chamois 05

Note: Grout to be sealed with Dominion Penetrating Concrete Sealer

- h. Partitions:
AM4 W901Kwik-Wall; Fabric Maharam; Sumac 007

2.2.7 Interior Ceiling Finishes

Ceiling colors shall apply to ceiling surfaces including soffits, furred down areas, grilles, diffusers, registers, and access panels. Ceiling color shall also apply to joist, underside of roof deck, and conduit and piping where joists and deck are exposed and required to be painted. Ceiling materials shall be provided to match the colors listed below.

- a. Acoustical Tile and Grid:
C301: Armstrong; Ultima, White w/Prelude MX Exposed Tee Grid
- b. Paint:
C201: Sherwin Williams; Renwick Beige 2805
AM4C401: Exposed Concrete, Standard Color

2.2.8 Interior Trim

Interior trim shall be provided to match the colors listed below.

- a. Doors:
D201: Manufacturer's Standard Factory Finished Med. Bronze
- b. Door Frames:
D201: Manufacturer's Standard Factory Finished Med. Bronze
- c. Windows (mullion, muntin, sash, trim, and stool):
T201: Manufacturer's Standard Factory Finished Med. Bronze
- d. Window Sills:
Sherwin Williams; Renwick Beige 2805
- e. Fire Extinguisher Cabinets:
White
- f. Handrails:
Sherwin Williams; Renwick Beige 2805

2.2.9 Interior Window Treatment

Window treatments shall be provided to match the colors listed below.

- a. Horizontal Blinds:
Levolor; Mushroom 365, 50mm

2.2.10 Interior Miscellaneous

Miscellaneous items shall be provided to match the colors listed below.

- a. Toilet Partitions, Vanities and Urinal Screen:
Santana; Poly Marble HD 675
- b. Plastic Laminate:
Counter in Room 103
Counter in Corridor 110
Counter Break Room 131&159
PL-1: Wilsonart, copper EV 4818-6

Security Control Station
Front:
PL-2; Wilsonart; Figured Mahogany
Worksurface
PL-3; Wilsonart; Khaki Brown D50-80
- c. Signage Message Color (excluding handicapped signage):
White.
- d. Signage Background Color (excluding handicapped signage):
Brown.
- e. Lockers:
Penco; Turquoise Teal 952
- f. Operable Partitions:
Kwik-Wall/ Maharam; Tek-Wall Trance 395660, Sumac 004
- h. Wall Switch Handles and Standard Receptacle Bodies:
Ivory
- i. Electrical Device Cover Plates and Panels:
Ivory

PART 3 ROOM COLOR AND FINISH SCHEDULE

Area: Lobby 100
Base Floor A Wall B Wall C Wall D Wall Ceiling
Matl: B301 F401 W8 W102 W8 W102 **AM4 C201**

NOTE; TILE TO BE INSTALLED AT A 45 DEGREE ANGLE

Area: **AMR** Toilet 101
Base Floor A Wall B Wall C Wall D Wall Ceiling
Matl: - **F401 W402/3 W402/3 W402/3 W402/3** C201

NOTE; TILE TO BE INSTALLED AT A 45 DEGREE ANGLE
SEE ARCH DRWG A 29 FOR PATTERN

Area: Corridor 102
Base Floor A Wall B Wall C Wall D Wall Ceiling
Matl: B301 F401 W101 W101 W101 W101 C201

NOTE; TILE TO BE INSTALLED AT A 45 DEGREE ANGLE

Area: Sec/Clerk 103
Base Floor A Wall B Wall C Wall D Wall Ceiling
Matl: B101 F101 W104 W104 W104 W104 C301

NOTE; PROVIDE MINI-BLINDS ON ALL EXTERIOR WINDOWS

Area: Vestibule 104
Base Floor A Wall B Wall C Wall D Wall Ceiling
Matl: B301 F401 W104 W104 W104 W104 C301

NOTE; TILE TO BE INSTALLED AT A 45 DEGREE ANGLE

Area: Agent-In-Charge 105

	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
Matl:	B101	F101	W104	W104	W104	W104	C301

Area: Asst. Agent

	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
Matl:	B101	F101	W104	W104	W104	W104	C301

Area: Field Supervisor 107

	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
Matl:	B101	F101	W102	W102	W102	W102	C301

Area: Field Supervisor 108

	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
Matl:	B101	F101	W102	W102	W102	W102	C301

Area: Field Supervisor 109

	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
Matl:	B101	F101	W102	W102	W102	W102	C301

Area: Corridor 110

	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
Matl:	B301	F401	W101	W101	W101	W101	C201

NOTE; TILE TO BE INSTALLED AT A 45 DEGREE ANGLE

Area: Files 111

	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
Matl:	B102	F201	W103	W103	W103	W103	C301

Area: Special Ops 112

	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
Matl:	B101	F101	W102	W102	W102	W102	C301

Area: Training Lab 113

	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
Matl:	B101	F101	W102	W102	W102	W102	C301

Note; See Arch. Drwg. for Ceiling Finish Placement

Area: Training Room 114

	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
Matl:	B101	F101	W101	W901	W101	W101	AM4 C201

Note; See Arch. Drwg. for Ceiling Placement

Area: Muster 115

	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
Matl:	B101	F101	W101	W101	W101	W901	AM4 C201

Note; See Arch. Drwg. for Ceiling Placement

Area: Storage 116

	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
Matl:	B102	F201	W101	W101	W101	AM4 W101	C301

Area: Corridor 117

	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
Matl:	B301	F401	W101	W101	W101	W101	AM4 C301

NOTE; TILE TO BE INSTALLED AT A 45 DEGREE ANGLE

Area: Women 118

	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
Matl:	AM4 -	F401	W401/2	W401/2	W401/2	W401/2	C201

NOTE; TILE TO BE INSTALLED AT A 45 DEGREE ANGLE
SEE ARCH DRWG A 29 FOR WALL TILE PLACEMENT

Area: Men 119

	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
Matl:	B301	F401	W401/2	W401/2	W401/2	W401/2	C201

NOTE; TILE TO BE INSTALLED AT A 45 DEGREE ANGLE
SEE ARCH DRWG A 29 FOR WALL TILE PLACEMENT

Area: Women Lockers 120

	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
Matl:	B301	F401	W401/2	W401/2	W401/2	W401/2	C201

NOTE; TILE TO BE INSTALLED AT A 45 DEGREE ANGLE
 SEE ARCH. DRWG. FOR WALL TILE PLACEMENT

Area: Corridor 121

	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
Matl:	B301	F401	W101	W101	W101	W101	C201

NOTE; TILE TO BE INSTALLED AT A 45 DEGREE ANGLE

Area: Exercise Room 122

	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
Matl:	B102	AM4 F101	W102	AM4 W102	W102	W102	C301
			W1001				

Area: Mechanical 123

	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
Matl:	-	F601	W701	W701	AM4 W101	W101	C101 Exposed

Area: Mens Lockers 124

	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
Matl:	AM4 -	F401	W401/2	W401/2	W401/2	W401/2	C201

NOTE; TILE TO BE INSTALLED AT A 45 DEGREE ANGLE
 SEE ARCH DRWG A 29 FOR WALL TILE PLACEMENT

Area: Reporting 125

	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
Matl:	B101	F101	W102	W102	W102	W102	C301

Area: SBPA 126

	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
Matl:	B101	F101	W102	W102	W102	W102	C301

Area: SBPA 127

	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
Matl:	B101	F101	W102	W102	W102	W102	C301

Area: SBPA 128

	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
Matl:	B101	F101	W102	W102	W102	W102	C301

Area: SBPA 129

	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
Matl:	B101	F101	W102	W102	W102	W102	C301

Area: Janitor 130

	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
Matl:	B102	F201	W103	W103	W103	W103	C201
		F202					

NOTE; TILE TO BE INSTALLED AT IN A CHECKER-BOARD PATTERN
 AT A 45 DEGREE ANGLE

Area: Break Room 131

	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
Matl:	B301	F401	W101	W101	W101	W101	AM4 C201 & C301

NOTE; TILE TO BE INSTALLED AT A 45 DEGREE ANGLE

Area: Corridor 132

	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
Matl:	-	F601	W701	W701	W701	W701	C301

Area: Armory 133

	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
Matl:	-	F601	W701	W701	AM4 W501	W701	AM4 C401
					W701		

Area: High-Power Muntins - 134

	Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling
Matl:	-	F601	AM4 W501	W501	W701	W701	C401

Area: Report Area 135							
Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling	
Matl: AM4 -	F601	W701	W701	W701	AM4 W501	C401	

Area: Dispatch Equip. 136							
Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling	
Matl: AM4 -	F601	W701	W701	W701	W701	AM4 C301	

Area: Evidence Storage 137							
Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling	
Matl: -	F601	W701	W701	W701	W701	AM4 C401	

Area: Evidence Control Officer 138							
Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling	
Matl: B102	F201	W701	W701	W701	W701	C301	

Area: RVS 139							
Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling	
Matl: B102	F801	W701	W101	W8	W701	C301	

Area: Equipment Comm/PBX 140							
Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling	
Matl: B102	F801	W701	W701	W701	W701	C301	

Area: Elec 141							
Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling	
Matl: B102	F801	W701	W701	W701	-	C301	

Area: UPS 142							
Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling	
Matl: B102	F801	W701	-	W701	W701	C301	

Area: Lan 143							
Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling	
Matl: AM4 -	F701	W701	W701	W701	W701	AM4 C201 Exposed	

Area: Detention Supervisor 144							
Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling	
Matl: B101	AM4 F101	W701	W701	W701	W701	C301	

Area: Security Control Station 145							
Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling	
Matl: B102	F801	W701	W101/8	W101/8	W101/8	C301	

Area: Processing Area 146							
Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling	
Matl: -	F701	W701	W101/8	W101/8	W101/8	C301	

Area: Interview 147							
Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling	
Matl: AM4 -	F701	W701	W701	W701	W701	AM4 C401	

Area: Male Holding 148							
Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling	
Matl: -	F701	W701	W701	W701	W701	C401	

Area: Chase 149							
Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling	
Matl: -	F601	W701	W701	W701	W701	C401	

Area: Male Holding 150							
Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling	
Matl: -	F701	W701	W701	W701	W701	C401	

Area: Corridor 151							
Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling	
Matl: -	F701	AM4 W701	W701	W701	W701	C301	

Area: Janitor 152							
Base	Floor	A Wall	B Wall	C Wall	D Wall	Ceiling	
Matl: -	AM4 F701	W701	W701	W701	W701	AM4 C201	

Area: Storage 153
 Base Floor A Wall B Wall C Wall D Wall Ceiling
 Matl: - F701 W701 W701 **AM4 -** W701 **AM4 C301**

Area: Mechanical 154
 Base Floor A Wall B Wall C Wall D Wall Ceiling
 Matl: - F601 W701 W701 W701 W701 **AM4 C101**
 Exposed

Area: Female Holding 155
 Base Floor A Wall B Wall C Wall D Wall Ceiling
 Matl: - F701 W701 W701 W701 W701 C401

Area: Juvenile Holding 156
 Base Floor A Wall B Wall C Wall D Wall Ceiling
 Matl: - F701 W701 W701 W701 W701 C401

Area: Segregated Holding 157
 Base Floor A Wall B Wall C Wall D Wall Ceiling
 Matl: - F701 W701 W701 W701 W701 C401

Area: Interview 158
 Base Floor A Wall B Wall C Wall D Wall Ceiling
 Matl: **AM4 -** **F701** W701 W701 W701 W701 **AMR C401**

Area: Coffee Bar
 Base Floor A Wall B Wall C Wall D Wall Ceiling
 Matl: **AM4 -** **F701** W701 W701 W701 W701 C301

MANUFACTURERS

EXTERIOR

EIFS Sto 404-346-3666
 stocorp.com

Ceramic Tile Dal-tile Donna Kohler 972-690-5724
 dal-tile.com

Graham Arch. Products 800-755-6274

Exterior Paint Sherwin Williams Ben Hammond 817-336-7111
 sherwinwilliams.com

Roof MBCI Johnny Johnson 972-988-3300
 mbci.com

INTERIOR

Carpet Interface Steve Savage 800-336-0225
 thesamplecenter.com

Porcelain Tile Dal-tile Donna Kohler 972-690-5724
 dal-tile.com

Access Flooring Interface Steve Savage 800-336-0225

Resilient Base Johnsonite Millicent McLane 800-899-8916 x727
 johnsonite.com

Interior Paint Sherwin Williams Ben Hammond 817-336-7111
 sherwinwilliams.com

Acoustical Ceilings Armstrong Chuck Hall 877-276-7876
 armstrong.com

Plastic Laminate Wilsonart Regina Phinney 254-207-2218

Lockers Penco 707-664-9964

cescompany.com

Operable Partitions
Kwik Wall

217-522-5553
kwik-wall.com

Fabric

Maharam

Teri Ryba

214-741-1547
maharam.com

-- End of Section --

SECTION 10101

MISCELLANEOUS ITEMS

08/2002

AMENDMENT #4

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

THE ALUMINUM ASSOCIATION (AA)

AA-03 (Sep. 1980, 7th Ed.) Designation System for Aluminum Finishes

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 543 (1981) Slate Blackboards

ASTM E 814 (1983) Fire Tests of Through-Penetration Fire Stops

PORCELAIN ENAMEL INSTITUTE (PEI)

PEI S 100 (1965) Architectural Porcelain Enamel on Steel for Exterior Use.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Chalkboards; .
Bulletin Boards; .
Fire Extinguisher Cabinets; G,.

Dock Bumpers.
Public Telephone Enclosures.

Submit fabrication, erection, and installation Drawings for each product listed in PART 2 PRODUCTS. Drawings shall show sizes, details of construction, method of construction, method of assembling, hardware materials, colors, method of mounting, location of each item, specifications for surface preparation and installation of items, and all other details pertinent to installation. For each product, drawings shall identify all parts by name and material. Materials fabricated or delivered to the job site before approval of the drawings shall be subject to rejection.

SD-03 Product Data

Chalkboards; G.
Bulletin Boards; .
Fire Extinguisher Cabinets; .
Projection Screens; .
Dock Bumpers; .
Public Telephone Enclosures; .

Furnish Manufacturer's Catalog Data.

SD-04 Samples

Chalkboards; G.
Bulletin Boards; G.

Unless otherwise indicated, samples shall be full size, taken from

manufacturer's stock, and be complete as required for installation. After approval, samples may be installed in the work provided each sample is clearly identified and its location recorded. Provide one sample(s) of each product listed in PART 2 PRODUCTS unless otherwise indicated below:

Each type writing and tack board surface, 150 mm square.

Full-size wall clips or anchoring devices.

Each type of frame, 200 mm long.

Each type of trim and chalk trough, 200 mm long.

Each accessory, full size.

1.3 DELIVERY AND STORAGE

Materials and products shall be delivered to the site in the manufacturer's original unopened containers with brand name and type clearly marked. Materials and products shall be carefully handled and stored in dry, watertight enclosures.

1.4 FIELD MEASUREMENTS

Field measurements shall be taken prior to the preparation of drawings and fabrication to ensure proper fits.

PART 2 PRODUCTS

2.1 GENERAL

Supplementary parts necessary to complete each product item shall be included even though such work is not definitely shown or specified. The Contractor shall furnish to the proper trades all anchors, sockets, or fastenings required for securing items to other construction. Details and specifications of items for which standard products are available are representative guides of requirements for such items. Standard products, generally meeting such requirements, will be accepted, if details of construction and installation are approved by the Contracting Officer.

2.1.1 Metal Thickness

Gages of sheet iron and steel specified are U. S. Standard for sheet and plate. Extruded sections shall be at least 3.125 mm thick, unless otherwise specified or shown on the drawings.

2.1.2 Aluminum Frames

Aluminum frames, trim, and accessories shall be fabricated of 6063-T5 or T6 extruded aluminum alloy. Corners and connections shall be hairline miter or butt joints. Exposed aluminum surfaces shall have a satin finish. Satin finish shall be chemically etched medium matte anodic coating, Class II Architectural, 0.4 mil thick, in accordance with AA-03.

2.2 BULLETIN BOARDS

Bulletin board shall consist of a tack boards and a snap-on aluminum frame. Frame shall be secured to the wall be means of concealed screws or bolt hangers. Bulletin board shall consist of a permanent header panel with a general title, such as "Notices" or "Information", and a 6.25 mm cork pinning surface glued to 6.25 mm thick plywood or hardboard backing. Cork shall have a plastic impregnated surface and burlap backing. The cork's surface finish shall be smooth and be free from air pockets, raised cork blemishes, and joint imperfections. Bulletin board design shall be as follows:

- a. Colors: Header panel - white letters on standard Black blue background; cork panel - medium gray.
- b. Dimensions: 75 mm by 150 mm .
- c. Message: Heading - upper and lower case helvetica medium, 50 mm capital letter height, flush left.
- d. Sign grid - see attached drawing.

Bulletin board shall consist of a tack board, aluminum tabular frame, and sliding aluminum framed glazed doors. Frame shall be secured to the wall be means of concealed screws or bolt hangers. Bulletin board shall consist of a permanent header panel with a general title, such as "Notices" or "Information", and a 6.25 mm cork pinning surface glued to 6.25 mm thick plywood or hardboard backing. Cork shall have a plastic

impregnated surface and burlap backing. The cork's surface finish shall be smooth and be free from air pockets, raised cork blemishes, and joint imperfections. Door frame shall have removable glazing bead applied on the inside. Glazing shall be 6.25 mm polished plate glass. Each bulletin board door shall be complete with hardware including key operated lock and full length piano type hinges. Hardware shall be aluminum with anodized finish matching the frame, except hinges shall be either brass with brushed chrome finish or aluminum with satin anodized finish. Bulletin board design shall be as follows:

- a. Colors: Header panel - white letters on standard black background; cork panel - medium gray.
- b. Dimensions: 75 mm by 150 mm 3'-0" by 6'-0".
- c. Message: Heading - upper and lower case helvetica medium, 50 mm capital letter height, flush left.
- d. Sign grid - see attached drawing.

2.3 CHALKBOARDS

All chalkboards and tackboards shall be the products of one manufacturer. Chalkboards shall consist of writing surface, tackboards as applicable, snap-on aluminum frame, chalk trough, mullions, display rail, and accessories. Chalkboards 3.6 meters or less in length shall be in one piece. Larger units shall have one joint in the center, jointed with a metal spline. Faces of the splines shall match, and be in the same plane as the frame.

2.3.1 Writing Surface

Writing surface shall be either slate or porcelain enamel, at the Contractor's option.

2.3.1.1 Porcelain Enamel

Writing surface shall be factory laminated assembly consisting of a face sheet of 0.59 mm (24 gage) sheet steel with porcelain enamel finish, a 9.4 mm to 13 mm thick plywood, particleboard, or hardboard core, and a 0.125 mm thick aluminum backing sheet. The porcelain enamel surface shall be fused to the steel at not less than 760 degrees C in accordance with PEI S 100. Color shall be white

2.3.2 Display (Map) Rail

Display rail shall be snap-on type, 25 mm wide and 6.25 mm thick cork insert in an extruded aluminum frame, and shall be mounted along the top of the chalkboard. Color of cork shall be a natural cork color.

2.3.3 Tack Board

Tack board shall have 6.25 mm thick core face factory laminated to a hardboard or particleboard core, and be of the thickness required so that the face of the cork will be in the same plane as the face of the writing surface. Color of the cork shall match the chalkboard surface.

2.3.4 Accessories

Accessories shall be fabricated from aluminum with snap-on holders of spring steel. Design shall be snap-on type for mounting on the display rail. Accessories shall include:

Map hooks, two per 100 mm section of display rail.

Paper holder, two per 100 mm section of display rail.

Roller map brackets with thumb screws, two per 200 mm section of display rail.

2.4 FIRE EXTINGUISHER CABINETS AND FIRE EXTINGUISHERS

Furnish and install Metal fire extinguisher cabinets and fire extinguishers. Cabinets to be located in fire-rated walls shall be fire-rated type, fabricated in accordance with ASTM E 814, and shall be listed by an approved testing agency for 1- and 2-hour combustible and non-combustible wall systems. The testing agency's seal shall be affixed to each fire-rated cabinet. Cabinets shall be of the recessed type suitable for 10 kg extinguishers. Box and trim shall be of heavy gage rolled steel. Door shall be a rigid frame with full length piano type hinge and double strength (DSA) glass panel. Door and box shall have the manufacturer's standard white baked enamel finish inside and

out.

2.5 DOCK BUMPERS

Bumpers shall be resilient rubber material of rubberized fabric truck tires cut to uniform size pads and punched to receive 19 mm supporting rods. Resilient portion of the bumpers shall be 300 mm high, 275 mm wide, and 150 mm deep, minimum. Bumpers shall be 150 mm thick, minimum stand out from dock, and closed with two 75 mm by 62.5 mm by 6.25 mm structural steel angles under approximately 680 kg pressure. Angles shall be welded to 19 mm rods at one end and closed with threaded rod and nut at the other end. Anchor leg of angle shall extend 62 mm beyond the rubber surface at each end and contain two or three 20 mm anchor bolt holes. Anchor the legs to the dock wall with preset 19 mm by 200mm cadmium plated J bolts or hex head bolts, nuts, and washers.

2.5.1 Wheel Chock-Stops

Chocks shall be made of rubberized fabric truck tires held together by 6.25 mm closer plates and three, 19 mm steel bolts. Chocks shall be 200 mm high by 200 mm wide and attached to the dock with a 250 mm chain, 6.25 mm thick. Provide one wheel chock per vehicle stall.

2.6 PUBLIC TELEPHONE ENCLOSURES

Public Telephone Enclosures shall be manufacturer's standard wall-mounted type with telephone directory shelf; minimum size - 775 mm height, 500 mm inches width, and depth. Back board shall be perforated and shall enclose sound-absorbent material. Enclosure shall be finished with plastic laminate, color as selected by the Contracting Officer. Directory shelf shall be large enough to hold two directories up to 50 mm thick each.

PART 3 EXECUTION

3.1 PREPARATION AND INSTALLATION

Mounting surface preparation and product installation shall be in accordance with the product manufacturer's written recommendations.

3.2 BULLETIN BOARDS

Bulletin boards shall be mounted with the top edge not higher than 160 mm above the floor.

3.3 CLEANING

Following installation, dirty or discolored surfaces of the products shall be cleaned, with the products left free of defects. Products that are damaged or improperly installed shall be removed and reinstalled or replaced with new products as directed.

-- End of Section --

SECTION 10800

TOILET ACCESSORIES

07/02

AMENDMENT #4

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 1036 (1991; R 1997) Flat Glass

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only or as otherwise designated. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-03 Product Data

Finishes
Accessory Items

Manufacturer's descriptive data and catalog cuts indicating materials of construction, fasteners proposed for use for each type of wall construction, mounting instructions, operation instructions, and cleaning instructions.

SD-04 Samples

Finishes; G
Accessory Items

One sample of each accessory proposed for use. Approved samples may be incorporated into the finished work, provided they are identified and their locations noted.

SD-07 Certificates

Accessory Items

Submit for each type of accessory specified, attesting that the items meet the specified requirements.

1.3 DELIVERY, STORAGE, AND HANDLING

Toilet accessories shall be wrapped for shipment and storage, delivered to the jobsite in manufacturer's original packaging, and stored in a clean, dry area protected from construction damage and vandalism.

1.4 WARRANTY

Manufacturer's standard performance guarantees or warranties that extend beyond a 1 year period shall be provided.

PART 2 PRODUCTS

2.1 MANUFACTURED UNITS

Toilet accessories shall be provided where indicated in accordance with paragraph SCHEDULE. Porcelain type, tile-wall accessories are specified in Section 09310 CERAMIC TILE. Each accessory item shall be complete with the necessary mounting plates and shall be of sturdy construction with corrosion resistant surface.

2.1.1 Anchors and Fasteners

Anchors and fasteners shall be capable of developing a restraining force commensurate

with the strength of the accessory to be mounted and shall be suited for use with the supporting construction. Exposed fasteners shall be of tamperproof design and shall be finished to match the accessory.

2.1.2 Finishes

Except where noted otherwise, finishes on metal shall be provided as follows:

<u>Metal</u>	<u>Finish</u>
Stainless steel	No. 4 satin finish
Carbon steel, copper alloy, and brass	Chromium plated, bright

2.2 ACCESSORY ITEMS

Accessory items shall conform to the requirements specified below.

2.2.1 Grab Bar (GB)

Grab bar shall be 18 gauge, 32 mm OD Type 304 stainless steel. Grab bar shall be form and length as indicated. Exposed mounting flange shall have mounting holes concealed. Grab bar shall have satin finish. Installed bars shall be capable of withstanding a 2.225 kN vertical load without coming loose from the fastenings and without obvious permanent deformation. Space between wall and grab bar shall be 38 mm.

2.2.2 Mirror, Metal (MM)

Metal mirror shall be bright polished stainless steel, mirror quality, 0.94 mm minimum thickness, edges turned back 6 mm and recess fitted with tempered hardboard backing, and theft-proof fasteners. Size shall be in accordance with paragraph SCHEDULE.

2.2.3 Mirror, Tilt (MT)

Tilt mirror shall be surface mounted and shall provide full visibility for persons in a wheelchair. Mirror shall have fixed tilt, extending at least 100 mm from the wall at the top and tapering to 25 mm at the bottom. Size shall be in accordance with the drawings. Glass for mirrors shall conform to ASTM C 1036 and paragraph Glass Mirrors.

2.2.4 Combination Paper Towel Dispenser/Waste Receptacle Units (PTDWR)

Dispenser/receptacle shall be semi-recessed and shall have a capacity of 400 sheets of C-fold, single-fold, or quarter-fold towel. Waste receptacle shall be designed to be locked in unit and removable for service. Locking mechanism shall be tumbler key lock. Waste receptacle shall have a capacity of 45 L. Unit shall be fabricated of not less than 0.8 mm stainless steel welded construction with all exposed surfaces having a satin finish. Waste receptacle that accepts reusable liner standard for unit manufacturer shall be provided.

2.2.5 Shower Curtain (SC)

Shower curtain shall be sized to suit conditions. Curtain shall be anti-bacterial nylon/vinyl fabric. Color shall be white.

2.2.6 Shower Curtain Rods (SCR)

Shower curtain rods shall be Type 304 stainless steel 32 mm OD by 1.24 mm minimum bent as required to meet installation conditions.

2.2.7 Soap Dispenser (SD)

Soap dispenser shall be surface mounted, liquid type consisting of a vertical Type 304 stainless steel tank with holding capacity of 1.2 L with a corrosion-resistant all-purpose valve that dispenses liquid soaps, lotions, detergents and antiseptic soaps.

2.2.8 Soap Holder (SH)

Soap holder shall be surface mounted Type 304 stainless steel. Separate supports shall be stainless steel.

2.2.9 Shelf, Metal, Light Duty (SMLD)

Light duty metal shelf shall be supported between brackets or on brackets. Brackets shall prevent lateral movement of the shelf. Shelf shall be 450 mm long. Shelf and brackets shall be stainless steel.

2.2.10 Towel Bar (TB)

Towel bar shall be stainless steel with a minimum thickness of 0.38 mm. Bar shall be minimum 19 mm diameter, or 16 mm square. Finish shall be satin.

2.2.11 Toilet Tissue Dispenser (TTD)

Toilet tissue holder shall be Type II - surface mounted with two rolls of standard tissue mounted horizontally. Cabinet shall be stainless steel, satin finish.

2.2.12 Waste Receptacle (WR)

Waste receptacle shall be Type 304 stainless steel, designed for surface mounting. Reuseable liner, of the type standard with the receptacle manufacturer, shall be provided. Capacity shall be not less than 45 lcubic meters. Receptacles with push doors and doors for access to the waste compartment shall have continuous hinges. Locking mechanism shall be tumbler key lock.

PART 3 EXECUTION

3.1 INSTALLATION

Surfaces of fastening devices exposed after installation shall have the same finish as the attached accessory. Exposed screw heads shall be oval. Install accessories at the location and height indicated. Protect exposed surfaces of accessories with strippable plastic or by other means until the installation is accepted. After acceptance of accessories, remove and dispose of strippable plastic protection. Coordinate accessory manufacturer's mounting details with other trades as their work progresses. Brackets, plates, anchoring devices and similar items used for mounting accessories in showers shall be bedded in a silicone or polysulphide sealant as they are set to provide a watertight installation. After installation, thoroughly clean exposed surfaces and restore damaged work to its original condition or replace with new work.

3.1.1 Recessed Accessories

Fasten accessories with wood screws to studs, blocking or rough frame in wood construction. Set anchors in mortar in masonry construction. Fasten to metal studs or framing with sheet metal screws in metal construction.

3.1.2 Surface Mounted Accessories

Mount on concealed backplates, unless specified otherwise. Accessories without backplates shall have concealed fasteners. Unless indicated or specified otherwise, install accessories with sheet metal screws or wood screws in lead-lined braided jute, teflon or neoprene sleeves, or lead expansion shields, or with toggle bolts or other approved fasteners as required by the construction. Install backplates in the same manner, or provide with lugs or anchors set in mortar, as required by the construction. Fasten accessories mounted on gypsum board and plaster walls without solid backing into the metal or wood studs or to solid wood blocking secured between wood studs, or to metal backplates secured to metal studs.

3.2 CLEANING

Material shall be cleaned in accordance with manufacturer's recommendations. Alkaline or abrasive agents shall not be used. Precautions shall be taken to avoid scratching or marring of surfaces.

3.3 SCHEDULE

Accessories Required

Room or Space	MG	PTD	SD	TTD
101	1	1	1	1
118	1	1	2	1
119	1	1	1	1
120	1	1	1	1
124	1	2	2	2

Accessories Required

Room or Space	MG	PTD	SD	TTD
<hr/>	<hr/>	<hr/>	<hr/>	<hr/>

-- End of Section --

SECTION 11143

ABOVEGROUND FUEL DISPENSING SYSTEM
11/2001
AMENDMENT #4

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced.
The publications are referred to in the text by basic designation only.

AMERICAN PETROLEUM INSTITUTE (API)

API STD 5L	1990 Line Pipe
API Spec 6D	1991 Pipeline Valves (Gate, Plug, Ball, and Check Valves)
API Spec 6FA	1985;R 1990 Fire Tests for Valves
API Spec 15LR	1990 Low Pressure Fiberglass Line Pipe

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME B16.3	1985 Malleable Iron Threaded Fittings, Classes 150 and 300
ASME B16.5	1988 (Errata 1988) Pipe Flanges and Flanged Fittings
ASME B16.21	1978 Nonmetallic Flat Gaskets for Pipe Flanges
ASME B16.39	1986 Malleable Iron Threaded Pipe Unions Classes 150, 250 and 300
ASME B31.1	1989 (Addenda 1989) Power Piping

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 53	1990 (Rev. B) Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
ASTM A 105	(1987a) Forgings, Carbon Steel, for Piping Components
ASTM A 167	(1989a) Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip
ASTM A 181	(1987) Forgings, Carbon Steel, for General-Purpose Piping
ASTM A 234	(1989a) Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures
ASTM A 307	1990 Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
ASTM A 733	(1989) Welded and Seamless Carbon Steel and Austenitic Stainless Steel Pipe Nipples
ASTM D 2996	(1995) Standard Specification for Filament-Wound "Fiberglass" (Glass-fiber-Reinforced Thermosetting-Resin) Pipe

CALIFORNIA AIR RESOURCES BOARD

CARB	California Air Resources Board Certification
------	--

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 30	1993 Flammable and Combustible Liquids Code
NFPA 30A	1993 Automobile and Marine Service Station Code
NFPA 70	1990 National Electrical Code
NFPA 780	1989 Lightning Protection Code

STEEL STRUCTURES PAINTING COUNCIL (SSPC)

SSPC SP 10	1989 Near-White Blast Cleaning
------------	--------------------------------

UNDERWRITERS LABORATORIES INC. (UL)

UL 142 1987	(R 1987) Steel Aboveground Tanks for Flammable and Combustible Liquids
UL 567 1989	(Mar 31, 1989; 6th Ed) Pipe Connectors for Flammable and Combustible Liquid and LP-Gas

1.2 SCOPE

This specification establishes the performance requirements for the relocation of the existing aboveground fuel storage, management and inventory control system to the new site. The system is currently located at the current Border Patrol Station in Sanderson, TX. This is approximately 1.6 km away from the new project site. The existing aboveground fuel storage, management and inventory control system consists of the following equipment:

- a. One 22712 litre above ground fuel storage tank. This tank is sectioned into a 17034 litre unleaded gasoline section and a 5678 litre diesel fuel section. The tank is a Supervault MH. The Supervault MH is a double walled steel and concrete tank.
- b. Fuel levels are currently monitored by an INCON TS1000 EFI tank sentinel system that is currently out of order.
- c. Fuel reports are produced by a TRAK Engineering program.
- d. One single hose side mounted consumer pump package unleaded gasoline dispensers and one single hose side mounted consumer pump package diesel dispenser.

1.3 VERIFICATION OF DIMENSIONS

The Contractor shall become familiar with all details of the work, verify all dimensions in the field, and shall advise the Contracting Officer of any discrepancy before performing any work. Materials and equipment shall fit into the space allocated without interference to building features or other equipment and with adequate and acceptable clearances allowed for entry, maintenance and operation

1.4 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-05 Design Data

Relocation Plan; G

The time line proposed and procedures to be used in the relocation of the fueling system and all associated devices shall be submitted within 30 days of receipt of the Notice To Proceed. This shall include provisions that the fueling system shall not be relocated until the roadways required for access are completed and all utility services required are complete. The system shall not be out of service for more than seven calendar days.

SD-06 Test Reports

Test Reports;.

Manufacturer's representative shall submit a report verifying the system readouts, wiring and flow rates are correct. This report shall also include an estimate of the cost required to repair any items that were not functioning prior to moving the system. Repairing these items will not be required under the base contract.

1.5 CONTRACTOR REQUIREMENTS

The Contractor shall obtain/maintain all state and local permits and licenses required to complete the work as specified in this section. The Contractor shall complete the work in accordance with this section as well as all applicable federal, state and local regulations.

The Contractor shall obtain all permits and certificates as required by local and State regulations.

PART 2 PRODUCTS

2.1 STANDARD PRODUCTS

Material and equipment shall be the standard products of a manufacturer regularly engaged in the manufacture of the products. Items of equipment shall essentially duplicate equipment that has been in satisfactory use at least 2 years prior to bid opening. Separately specified equipment items may be purchased as an integrated system provided that all parts of the system meet the individual specifications herein. All materials shall be resistant to the effects of diesel fuel and gasoline. The completed installation shall conform to the applicable requirements of NFPA 30.

2.2 PIPE AND FITTINGS

2.2.1 Above Ground Supply and Return Product Pipe

Supply product piping shall be black carbon steel, ASTM A 53, Type E or S, Grade A or B, or API 5L, seamless or electric-weld, Grade A or B, Schedule 40.

2.2.2 Steel Pipe Fittings

Steel pipe fittings shall conform to the following:

2.2.2.1 Welding Fittings

ASTM A 234, WPB.

2.2.2.2 Threaded Fittings

ASME B16.3, 150 pound class.

2.2.2.3 Flanged Fittings

ASME B16.5, ASTM A 181, or ASTM A 105, 150 pound class.

2.2.2.4 Couplings

API 5L, seamless, extra heavy, wrought steel with recessed ends.

2.2.2.5 Nipples

ASTM A 733 and of the same material as the pipe supplied.

2.2.2.6 Unions

ASME B16.39.

2.2.2.7 Flexible Connectors

Flexible connectors shall be rated for a working pressure equal to or greater than that of the pipe test pressure. Flexible connectors shall be capable of sustaining, at minimum, an axial compression of 22.2 mm, an axial elongation of 12.7 mm, a lateral deflection of 25.4 mm, and allow up to a 30 degree angular movement. Flexible connectors shall conform to the requirements of UL 567.

2.2.3 Joint Compound

All joint compounds for any type of piping system shall be resistant to water and shall be suitable for use with fuel containing 40 percent aromatics.

2.2.4 Flange Gaskets

Flange gaskets shall conform to ASME B16.21 - classification for compressed sheet with nitrile binder and acrylic fibers for maximum 371.11 C. service.

2.2.5 Fasteners

The Contractor shall supply two 12.7 mm diameter, 76.2 mm long stainless steel wing nut and bolt assemblies suitable for outdoor use to fasten the blind flange to the flanged tee at the shut-off valve access location.

2.3 PIPE SLEEVES

Pipe sleeves shall be of sufficient length to pass through the entire thickness of the associated structural member and shall be large enough to provide a minimum clear distance of 12.5 mm between the pipe and sleeve, except where otherwise indicated. Sleeves through concrete may be 20-gauge metal, fiber, or other approved material.

2.4 VALVES

Ball valve shall have one piece body and shall have a minimum bore not less than 55 percent of the internal cross sectional area of a pipe of the same nominal diameter. Valve shall be fire tested and qualified in accordance with API Spec 6FA. Valve shall be non-lubricated and operate from fully open to fully closed with 90 degree rotation of the ball.

2.5 ELECTRICAL COMPONENTS

Electrical components to be installed shall be as required in SECTIONS 16375A ELECTRICAL DISTRIBUTION SYSTEM, UNDERGROUND and 16415 ELECTRICAL WORK, INTERIOR and NFPA 70.

PART 3 EXECUTION

3.1 STORAGE TANK INSTALLATION

Install storage tank, vents and other connections in accordance with NFPA 30, recommendations and published instructions of the manufacturer. Provide grounding of tanks directly through ground rods or through bonding to grounded network in accordance with NFPA 780. Fasten aboveground fuel storage tanks on a firm reinforced concrete foundation.

3.1.1 [Enter Appropriate Subpart Title Here] 3.2 PIPING

3.2.1 Aboveground Fuel Piping

Above ground fuel piping in the system shall be carbon steel. Piping connections to equipment shall be as indicated or as required by the equipment manufacturer. The interior of the pipe shall be thoroughly cleaned of all foreign matter before being installed and shall be kept clean during installation. When work is not in progress, open ends of pipe and fittings shall be securely closed so that water, earth, or other substances cannot enter the pipe or fittings. Any pipe, fittings, or appurtenances found defective after installation shall be replaced. Threaded joints shall be made with tapered threads and shall be made perfectly tight with joint compound applied to the male threads only.

3.2.2 Cutting Pipe

Unless otherwise authorized, steel pipe shall be cut with a mechanical wheel cutter. Pipe shall be deburred and reamed to true internal diameter.

3.2.3 Installing Piping

Pipe and accessories shall be handled carefully to assure a sound, undamaged condition. All fuel piping shall be above ground. Piping passing through concrete or masonry construction shall be fitted with sleeves. Sleeves shall be accurately located on

center with the piping and shall be securely fastened in place. The space between the sleeves and the pipe shall be caulked and filled with bituminous plastic cement, silicone caulk or mechanical caulking units designed for such use.

3.2.4 Welding

3.2.4.1 Welding of Piping

Welding of joints in piping, butt welds, fillet welds, bends, loops, offsets, and cleaning of pipe shall be in accordance with ASME B31.1. Welds shall be visually examined and meet acceptance standards specified in Chapter VI of ASME B31.1.

3.2.4.2 Quality of Welds

Quality of welds, correction of defects, stress relieving, and preheating shall be in accordance with ASME B31.1.

3.2.5 Unions and Flanges

Place unions and flanges where necessary to permit easy disconnection of piping and apparatus. Each connection having a threaded end valve shall have a union. Each flanged connection shall be gasketed.

3.2.6 Valves

Install valves in positions accessible for operation and repair and as shown on the contract drawings.

3.3 ELECTRICAL

Motors, manual or automatic motor control equipment and protective or signal devices required for the operation specified herein shall be provided under this section in accordance with SECTIONS 16375A ELECTRICAL DISTRIBUTION SYSTEM, UNDERGROUND, ELECTRICAL DISTRIBUTION SYSTEM, UNDERGROUND and 16415 ELECTRICAL WORK, INTERIOR and NFPA 70. Any wiring required for the operation specified herein, but not shown on the electrical section of the contract drawings, shall be provided under this section in accordance with SECTIONS 16375A ELECTRICAL DISTRIBUTION SYSTEM, UNDERGROUND, ELECTRICAL DISTRIBUTION SYSTEM, UNDERGROUND and 16415 ELECTRICAL WORK, INTERIOR and NFPA 70.

Provide switches and devices required for controlling electrical equipment. Pumps shall be wired and ready for connection to power circuit. Wiring, equipment, and fittings shall be explosion-proof in conformance with applicable requirements of UL 674, UL 698, and UL 886 for Class I, Division 2 hazardous locations. Submit proof of such conformance. Electrical installations shall conform to requirements of NFPA 70.

3.4 FUEL SUPPLY

The fuel in the tanks shall be removed prior to moving the system. The fuel that is removed becomes property of the Contractor. **(Am #4) Fuel tanks will be reduced to a one fourth of a tank or less when the contractor begins removing fuel. Once the system has been installed it will be filled completely with new fuel.** Once testing is complete, the tanks shall be filled to full with either new fuel, or the captured fuel used during the testing. **(Am #4) The contractor shall notify the contracting officer 60 days before removing fuel from the existing tanks.**

3.5 TESTING

After components of the system have been properly adjusted, the system shall be tested by a manufacturer's representative to demonstrate that the system meets the performance requirements for which it was designed. If any portion of the system and or piece of equipment fails to pass the tests specified in this specification section, the Contractor shall make the necessary repairs or adjustments and the test shall be repeated until satisfactory performance is achieved. This does not include items not working prior to moving the system. All tests shall be witnessed by the Contracting Officer, and the Contractor shall notify the Contracting Officer 7 days before testing. All personnel, calibrated instruments and equipment, as well as the fuel required to properly clean and flush the system and to conduct the tests shall be furnished by the Contractor.

3.5.1 Aboveground Storage Tank Tests

3.5.1.1 Tightness Tests

Aboveground tank shall be tightness tested at operating pressure in accordance with manufacturer's instructions and NFPA 30, 2-8.3, prior to placing the tank in service. During testing, tank shall be provided with a suitable pressure relief device. Prior to application of test pressure, remove or valve off piping components which may be damaged by test and install a calibrated test gauge in the system. Maintain test pressure within five percent of initial pressure for at least 2 hours. The Contractor may abort and restart the tightness test when failure occurs. Materials and equipment shall be subject to inspection at the installation site by the Contracting Officer.

3.5.1.2 Manufacturer's Tests

Following the tank tightness test, storage tank shall be leak tested in accordance with the manufacturer's written test procedure if the manufacturer's test procedure is different from the tightness tests already performed. Any test failure shall require corrective action and retest.

3.5.2 Piping Tests

Care shall be taken not to exceed pressure rating of the various fittings. To facilitate these tests, various sections of the piping system may be isolated to test each separately. Fittings that can be attached to the end of the section of pipe being tested and that will permit direct connection to the piping from the air compressor shall be furnished by the Contractor. No taps in the pipe will be permitted. Gauges shall be subject to approval of the Contracting Officer. In the event leaks are detected, the pipe shall be repaired and the test repeated at no cost to the Owner. On satisfactory completion of tests, the pressure shall be relieved and the pipe immediately sealed. Provision shall be made to prevent displacement of the piping during testing. Personnel shall be kept clear of the piping during pneumatic testing. Equipment such as pumps, tanks, dispensers, and meters shall be isolated from the piping system during this test. Gauges used in the pneumatic tests for primary piping shall have a scale with a maximum limit of 7.03 kg/sq.cm.

3.5.2.1 Fuel Piping

Fuel piping, including both liquid carrying and vent/vapor piping, shall be tested under a pneumatic pressure of at least 1-1/4 times the designed working pressure of the particular piping system, but not less than 3.52 kilograms per cm² (50 psi). Pressure in primary piping shall be maintained for at least 2 hours during which there shall be no drop in pressure in the pipe greater than that allowed for thermal expansion and contraction. Leaks discovered shall be repaired in accordance with manufacturer's instructions. The entire pneumatic test shall be performed again in the event a leak is discovered.

3.5.2.2 Manufacturer's Tests

Following the required pneumatic piping tests, piping shall be leak tested in accordance with the manufacturer's written test procedure if the manufacturer's test procedure is different from the tightness tests already performed. Any test failure shall require corrective action and retest.

3.5.3 System Performance Tests

After all components of the system have been properly adjusted, the system shall be tested to demonstrate that the system meets the performance requirements for which it was designed. If any portion of the system or any piece of equipment fails to pass the tests, the Contractor shall make the necessary repairs or adjustments and the test shall be repeated, at no cost to the Owner, until satisfactory performance is achieved. In order to conduct tests that require the tanks to be filled or partially filled with product, the Contractor shall coordinate with the Contracting Officer for the scheduling of product delivery. The tests shall demonstrate the following:

- a. The tank unloading system performs as designed.
- b. The tank fill assembly performs as designed.
- c. The dispensers are operational and perform as designed.

- d. Each meter/gauge is operational.

3.5.4 Low Liquid Level Pump Shut off Test

The storage tank shall be initially filled to approximately 25 per cent of its capacity with the appropriate product. The storage tank shall then be pumped out to verify that at 10 per cent (field adjustable) of the tank capacity that the pump shuts-off.

3.5.5 Overfill Flow Limiter Test

The Contractor shall monitor the filling of each new storage tank with the appropriate fuel in order to verify that the storage tank fill limiter functions as designed. Tank overfill shall stop immediately once the overfill devices operates. Under no circumstances shall the Contractor overfill any storage tank more than 95 per cent full even if the overfill limiter does not function as designed.

3.5.6 System Leak Test

The fuel system shall be visually inspected during system performance testing for leaks.

3.6 PERFORMANCE TEST REPORTS

Upon completion of testing of the installed system, test reports shall be submitted in booklet form showing all field tests performed to adjust each component and all field tests performed to provide compliance with the specified performance criteria. Each test report shall indicate the final position of controls.

3.7 VISUAL INSPECTIONS

The exterior surface of the tank shall be inspected for obvious visual damage prior to the placement of the tank. Surface damage to a storage tank shall be corrected according to manufacturer's requirements before proceeding with the system installation.

3.8 DEMONSTRATIONS

Contractor shall conduct a training course for the operating staff as designated by the Contracting Officer. The training period shall consist of a total of 2 hours of normal working time, and shall start after the system is functionally completed but prior to final system acceptance. The field instructions shall cover all of the items contained in the operation and maintenance manuals as well as demonstrations of routine maintenance operations.

-- End of Section --

SECTION 11300

AUTOMATED FUEL MANAGEMENT SYSTEM
07/2003
AMENDMENT #4

PART 1 GENERAL

1.1 SUMMARY (Not Applicable)

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 30	(1996) Flammable and Combustible Liquids Code
NFPA 30A	(1996) Automotive and Marine Service Station Code
NFPA 70	(2002) National Electrical Code

UNDERWRITERS LABORATORIES (UL)

UL 698	(1995; R 1996) Industrial Control Equipment for Use in Hazardous (Classified) Locations
UL 886	(1994; Bul. 1994, 1995, and 1996, R 1995) Outlet Boxes and Fittings for Use in Hazardous (Classified) Locations
UL 1238	(1975) UL Standard for Safety Control Equipment for Use with Flammable Liquid Dispensing Devices

1.3 SCOPE

An automated fuel management system shall be relocated from the existing Border Patrol Station located in Sanderson, Texas (Am#4). A new satellite terminal shall be provided to communicate with the master key or card reader. The system shall control access to the fueling system by reading either the key reader or card reader cards. The automated fuel management system shall consist of the following equipment:

- a. A relocated central control computer located in the Equipment Room.
- b. All Year 2000 compliant required fuel management system software installed and configured on the central computer.
- c. All interface cards in the central computer required to communicate with the security access terminals and telephone lines.
- d. A relocated on-site printer located with the central computer.
- e. One new satellite security access terminal (card readers). Located at the diesel AST.
- f. All interface relays and pulsers necessary to communicate and control the fueling system dispensers and pumps.

1.4 SYSTEM DESCRIPTION

This specification establishes the performance and design requirements for an Automated Fuel Management System (AFMS) that shall control and record the dispensing of fuel. The vendor shall provide a stand alone system, capable of unattended operation for 7 days a week, 24 hours a day. Fuel products shall be limited to equipment and operators with authorized keys. Dial up of the island key reader(s) shall be by voice grade telephone or direct connected to the island unit with user-friendly software loaded on a remotely located PC. The fuel management system (automated data collection system) shall reliably read all keys and have the ability to lock out any key.

1.5 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-03 Product Data

Components and Equipment Data; G

Manufacturer's catalog data shall be included with the detail drawings for the following items. The data shall be highlighted to show model, size, options, etc., that are intended for consideration. Data shall be adequate to demonstrate compliance with contract requirements for the following:

- a. Fuel Management Software
- b. Interface cards for Central Computer
- c. Total number of hoses for master unit
- d. Satellite island key reader (if required)
- e. Total number of hoses for satellite
- f. Tank monitor interface (if required)
- g. On-site printer (if required)
- h. Total number of keys for system

SD-02 Shop Drawings

Automated Fuel Management System (AFMS); G

Drawings shall consist of equipment layout including assembly and installation details and electrical connection diagrams. Drawings shall include any information required to demonstrate that the system has been coordinated and will properly function as a unit and shall show equipment relationship to other parts of the work, including clearances required for operation and maintenance.

SD-07 Certificates

Field Training Schedule;

Proposed schedule for field training, at least 2 weeks prior to the start of related training.

SD-10 Operation and Maintenance Data

Operation and Maintenance Manuals; G

Six (6) copies of O&M Manuals shall be provided.

1.6 QUALITY ASSURANCE

Material and equipment shall be standard products of a manufacturer regularly engaged in the manufacture of the products. Materials shall be resistant to diesel fuel and gasoline. Completed installation shall conform to applicable requirements of NFPA 30 and NFPA 30A.

PART 2 PRODUCTS

2.1 AUTOMATED FUEL MANAGEMENT SYSTEM (AFMS)

The AFMS shall be TRAK ENGINEERING INC., SENTRY V or approved equal.

2.1.1 System Capability

Each Automated Fuel Management System (AFMS) shall have the ability to simultaneously control up to four hoses. Each hose shall be individually set for any number of pulses between 1 and 1000 for each unit of measurement.

2.1.2 System Components

The AFMS shall, as a minimum, Security Access Terminal (SAT) at the diesel and unleaded each Above Ground storage tanks.island,. and a Aa central control computer on site, and all related communication devices.

Read keys are used to activate the system by insertion into a key reader and are unique to each vehicle, user, or supervisor. Keys shall attach to vehicle key rings. Keys should be capable of being written to 100,000 times, and vehicle keys should contain the previous transaction mileage and range for reasonability check. Quantity and product restrictions are also to be encoded on keys. Keys must have gold plated contacts and pins. Keys cannot require a turning or twisting motion to activate the system.

A key reader device Security Access Terminal (SAT), located at the diesel and unleaded ffueling tanks uelon the fuel islands are shall be used to turn fuel dispensers on and off, monitor fuel dispensed, recognize authorized keys and interface with existing

dispensers and tank level monitoring systems. The SAT shall also be capable of reading magnetic strip "Wright Express" cards.

2.1.2.1 Security Access Terminal (SAT)

An main SAT shall be located at the unleaded gasoline each AST. The satellite terminal shall be located at the diesel AST. The SAT shall have a 40 character alphanumeric LCD display, and alphanumeric keypad and a key reader device. The SAT shall be capable of independant operation. The SAT shall be capable of storing 4000 transactions. The terminal shall have an operating range of -50 degrees C (-60 degrees F) to 60 degrees C (+140 degrees F) and withstand rain, snow, and blowing sand. The terminal shall have a timeout feature that shall deactivate the transaction if the dispenser is not started within a preset time period. The time period shall be adjustable from 10 to 255 seconds. The SAT shall interface with the dispenser through a solenoid valve and a pulser/totalizer. The SAT shall permit diagnostic testing of boards, LCD, and keypad using the supervisor's password. The card reader device shall be provided and operational but shall be covered by a weather tight blank plate that when removed, the reader will be fully functional.

A key encoder interfaces with the Central Controller to permit transferring data onto keys.

Software is installed on an IBM compatible PC, permitting the encoding and reencoding of keys; manipulation of transaction data for printing reports on vehicles, users, products, etc.; downloading of transactions and uploading of authorized user/vehicle lists and transfer and storage of data.

a. Non-volatile memory

In the event of a power failure to the SAT, the system shall have the capability to store all data collected up to the time of the power failure for a minimum period of three months. The equipment at each fueling site must have the ability to operate if the central processor is down, limited only by the key reader's internal storage capacity. There shall be a method to access dispenser transaction information should there be data transmission problems. The mainboard, with memory, shall be removable and must be capable of being installed in an operating unit and downloaded; or, if the central controller is inoperable, another central controller shall be capable of downloading data. Support for this shall also be provided by the factory when required.

2.1.2.2 Central Control Computer

A personal computer (PC) shall be used as the Central Controller. This Central Controller shall be relocated from the existing Border Patrol Station located as described above. This computer shall be capable of communicating with the SATs by fiber optic cable or RS-422 communications.

2.1.2.3 Printer

The printer shall be relocated as described above.

2.1.2.4 Dispenser Interface

The AFMS shall include all necessary equipment to control and interface with the fueling dispensers. The pulser/totalizer unit shall be capable of measuring flow to less than 0.378 liters (0.10 gallon).

2.2 SOFTWARE

The AFMS software is to be installed on the contractor-supplied PC, permitting interface with the Key reader and the Wright Express card reader; manipulation of transaction data for printing reports on vehicles, users, products, etc.; downloading of transactions and uploading of authorized user/vehicle lists and transfer and storage of data. Transaction data may be transferred to any program accepting a flat ASCII file. Software shall include an invoicing capability which allows the user to generate invoices for selected customers or agencies from the central controller printer. Invoices shall list each transaction for all vehicles for a user-selected period.

2.2.1 Software Configuration

The software shall be permit system access by requiring the key reader and a verifiable identification number or a "Wright Express" magnetic strip card reader with an identification number. The configurations shall support the option of terminating a transaction (thus not permitting refueling) if a vehicle's odometer reading is out of the range.

2.3 SYSTEM CONFIGURATION

The equipment and software shall be capable of operating in the five different system

access configurations listed below (operating as either a one key or two key system with driver providing keypad input). All configurations shall support the option of terminating a transaction (thus not permitting refueling) if a vehicle's odometer reading is out of the range encoded on its key. The buyer shall have the option of selecting the initial configuration and the option of changing the configuration at a later date should operational requirements so dictate.

- o Vehicle key and verifiable driver number
- o Vehicle key and unverified driver number
- o Driver key and verifiable vehicle number

Vehicle Keys. Data on Vehicle Keys is as follows:

- o Key identification number
- o Vehicle budget or agency number
- o Vehicle license number
- o Fuel type (allows pumping of designated fuel type only)
- o Maximum number of gallons/units allowed per transaction for each product type
- o Odometer of hour reading
- o Preventive maintenance reminder (oil change mileage, etc.)
- o Site signature to identify the applicable owner's system

Supervisor Keys. Supervisor keys shall allow the on-site supervisor special access to the site's key reader. This access allows the supervisor to:

- o Change the key reader's configuration, to include time/date, product codes, hose numbers, tank numbers, pulser divide rate, no pulse time out, key timer setting, pump finish timer, message duration setting, zero-quantity shutdown, and pump handle switch control
- o Issue fuel
- o Update a vehicle key's PM flags
- o Activate semi-manual mode of fuel issue
- o Initiate on-site reports generation
- o Enter fuel drops and corrections to fuel drops
- o Perform diagnostic testing of system components

2.4 OPERATOR INPUT AT FUELING STATION

The system shall include a key reader with a liquid crystal display (LCD) using light emitting diodes (LED) with backlight, that is a minimum of 2 lines by 40 characters. It must also include a numeric key pad (0 through 9, A through D, Enter/Yes, and Clear/No) located near the pumps. The operator shall be prompted by the LCD to input information (which shall be recorded as part of the transaction record) for each transaction in accordance with paragraph SYSTEM CONFIGURATION.

2.5 DATA MANAGEMENT AND REPORTING

Each island key reader may be downloaded by the central controller operator at his/her convenience or at a time of day programmable by the central controller operator. When automatically downloading, the system shall dial each site in sequence and generate a report of all transactions for individual sites once each 24 hour period. The system must be capable of unattended dialing and downloading, thus permitting downloading when sites are not in use and when phone rates are less. The software shall operate on an IBM compatible PC using DOS 3.3 or higher, with 640Kb of RAM and 10Mb of hard disk space.

2.5.1 Report Generation

The system shall provide the following information at the central controller as a transaction record:

- a. User identification number
- b. Vehicle odometer reading
- c. Vehicle Number
- d. Number of units dispensed
- e. Fuel site
- f. Data & time
- g. Hose number
- h. Product number

2.5.2 Report Information Requirements

The system shall be capable of totaling monthly fuel costs by system identification number, vehicle identification number, key identification number, and driver number.

2.5.3 Totalization of Data

The system shall keep a inventory of fuel remaining in storage. The inventory report shall give a summary of the remaining fuel in each storage tank monitored. It shall also note when fuel should be purchased for a specific tank.

2.5.4 Inventory Records

The system shall allow the operator to compile summary reports for all transactions by system, date, vehicle, etc.

2.5.5 Summary Reports

The system shall print an exception report for all vehicles which have an out of range odometer reading entered during the reporting period.

2.5.6 Preventative Maintenance

The system shall print an exception report for all vehicles that are due for preventive maintenance during the reporting period.

2.5.7 Record Display

The central controller shall be capable of displaying reports on the central controller monitor before the reports are printed. When reports are displayed on the monitor, the user shall be capable of scrolling up and down to view any page of the report.

2.5.8 System Operating Modes

2.5.8.1 Normal Operation Mode

The AFMS shall accept "Wright Express" magnetic cards and keys, dispense fuel, and track all operations as delineated in this specification.

2.5.8.2 Semi-Manual Mode

The system shall have the capability to record fuel dispensed in emergency situations when there is a need for vehicles without keys to be refueled or to streamline refueling operations, and yet accountability is still desired. With this option, individual key readers may be put into the semi-manual mode with a supervisor's key. When in this mode, fuel can be dispensed by any pump as if the key reader were not functioning, but the key reader will record all transactions as semi-manual transactions.

2.5.8.3 Manual Override Mode

The system shall permit manual override of the AFMS. The override must be a complete, total by-pass of the AFMS. Thus any requirement that parts of the fuel management system be operational for the manual override to function is unacceptable.

2.5.9 AFMS Prompts

The system shall have the capability to customize the initial entry prompt, user ID or vehicle ID prompts.

2.6 ELECTRICAL COMPONENTS

Electrical components to be installed shall be as required in Section 16415 ELECTRICAL WORK, INTERIOR.

PART 3 EXECUTION

3.1 ELECTRICAL WORK

The AFMS has three (3) components that require electrical connection. The first is the Central Controller, which is a PC. The second and third are the SATs which are free standing pedestal facilities (the card readers key readers) which are located on each fueling island (1 per island). The electrical connections required for power and control to each of these units are given below.

3.1.1 POWER

3.1.1.1 Central Controller (PC)

A new 120 Volt circuit and duplex receptacle outlet (20 Amp, NEMA 5-20R) shall be installed for the PC. The receptacle shall be located in the building near the PC location indicated. Location to be approved by the Contracting Officer. A 13mm (1/2") EMT conduit, w/ 3 # 12 THWN Cu., from the receptacle to the new power panel, which is required in Section 16415 ELECTRICAL WORK, INTERIOR, shall be installed.

3.1.1.2 Security Access Terminal (SAT)

A 19 mm (3/4") RGS power conduit from the SAT on an island, to each fuel dispenser on that island. The RGS conduit shall be as a Class I, Division 2 installation per NEC Art. 501. Power wiring and connections per the manufacturers requirements from each dispenser unit to each SAT shall be installed.

3.1.2 CONTROL/INSTRUMENTATION

3.1.2.1 Central Controller (PC)

Provide a 19 mm (3/4") RGS conduit from each SAT to the Central Controller (PC). Within 6 m of the tank/dispenser assembly, the RGS conduit shall be a Class I, Division 2 installation per NEC Art. 501. More than 6 m away from the tank/dispensers the conduit does not need to be Haz. Area. Below ground it shall be Sch. 40 PVC. Above ground it shall be RGS. Provide control wiring (or fiber optic cable) and connections per the manufacturers requirements from the PC to each SAT. Where feasible, the two conduit runs may be combined into one 25.4 mm conduit (eg: the home run from the fuel dispensing island to the PC may be one 25.4 mm conduit).

a. Modem Cable Conduit

Provide a 19 mm (3/4") EMT conduit from the PC location to the building telephone backboard (the point at which new or additional telephone lines will come into the building). This conduit is for a future (by others) telephone/modem connection to each of the SAT units. The telephone/cable routing will be from the telephone backboard to the PC location (in the new EMT conduit), and from there to each of the SAT units located at the fueling stations (using the control/instrumentation conduit required above).

3.1.2.2 Security Access Terminal (SAT)

Provide a 19 mm (3/4") RGS conduit from each SAT to each corresponding Fuel Dispenser, located on that island. The RGS conduit shall be as a Class I, Division 2 installation per NEC Art. 501. Provide control wiring (or fiber optic cable) and connections per the manufacturers requirements from each SAT to the corresponding Fuel Dispenser.

3.1.3 Surge Protection

The system shall have surge (lightning) protection on the AC power line and on the telephone line. Surge protection shall be designed specifically for the voltage and current requirements of fuel management systems.

3.1.4 Electrical Services

This equipment shall be designed and installed to operate from 120 volt AC, 60 Hz single phase power.

3.2 MAINTAINABILITY

Suitable clearance and access shall be provided to all maintainable points. The system shall be of modular construction and have circuit boards/components that are replaceable by the user.

3.3 Operation and Maintenance Manuals

The manuals shall include the manufacturer's name, model number, parts list, list of parts and tools that should be kept in stock by the owner for routine maintenance including the name of a local supplier, simplified wiring and controls diagrams, troubleshooting guide, and recommended service organization (including address and telephone number) for each item of equipment. Each service organization submitted shall be capable of providing 4 hour onsite response to a service call on an emergency basis.

3.4 TRAINING

3.4.1 General

Furnish Field Training Schedule. The training course shall be conducted for the operating staff members designated by the Contracting Officer in the maintenance and operation of the system, including specified hardware and software. A training day is defined as 8 hours of classroom instruction, including breaks and lunchtime, Monday through Friday, during the daytime shift in effect at the training facility. For guidance in planning the required instruction, the Contractor shall assume that the attendees will have a high school education or equivalent, and are familiar with fuel dispensing systems. No training shall be scheduled until training manuals and O&M manuals have been approved by the Government.

3.4.2 Training Course Content

The course shall be taught at the project site for a period of 2 training days. The training course shall cover all the material contained in the Operating and Maintenance Instructions, the layout and location of the fuel dispensing system, the layout of the SAT and the locations of each, the location of each fueling system?control device external to the SATs, preventive maintenance, troubleshooting, diagnostics, software configuration, system reports, emergency manual control procedures, and repair procedures.

3.5 WARRANTY

The Manufacturer shall warranty parts and labor of all equipment supplied for a period of one (1) year. All replacement parts shall be provided by the Manufacturer for this one (1) year period.

-- End of Section --

SECTION 11400

INVENTORY CONTROL SYSTEM

01/02

AMENDMENT #4

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 30 (1996) Flammable and Combustible Liquids Code

NFPA 30A (1996) Automotive and Marine Service Station Code

NFPA 70 (1993) National Electrical Code

UNDERWRITERS LABORATORIES (UL)

UL 1238 (1975) UL Standard for Safety Control Equipment for Use with Flammable Liquid Dispensing Devices

UL 698 (1995; R 1996) Industrial Control Equipment for Use in Hazardous (Classified) Locations

UL 886 (1994; Bul. 1994, 1995, and 1996, R 1995) Outlet Boxes and Fittings for Use in Hazardous (Classified) Locations

1.2 SCOPE

This specification establishes the performance and design requirements for an inventory control system. This system will provide automatic tank gauging, interstitial leak sensing for the tanks and automatic inventory of the fueling system. The inventory control system shall consist of a, interstitial monitors, tank level monitors, overfill alarms, and overfill alarm acknowledgement switch for the (Am#4) 17034 liter unleaded tank and the (Am#4) 5678 liter diesel tank. Existing monitor shall be relocated and used to communicate with the new monitoring probes. (Am#4) Contractor shall assure proper operation of the system.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-03 Product Data

Components and Equipment Data.

Manufacturer's catalog data shall be included with the detail drawings for the following items. The data shall be highlighted to show model, size, options, etc., that are intended for consideration. Data shall be adequate to demonstrate compliance with contract requirements for the following:

- a. Interstitial Monitors
- b. Intank Level Monitors

Work Plan;

The work plan shall include the procedures proposed for the accomplishment of the work. The procedures shall provide for safe conduct of the work, including procedures and methods to provide necessary supports, lateral bracing and shoring when required, careful removal and disposition of materials specified to be salvaged, protection of property which is to remain undisturbed, coordination with other work in progress, and timely disconnection of utility

services. The procedures shall include a detailed description of the methods and equipment to be used for each operation, and the sequence of operations in accordance with EM 385-1-1.

SD-02 Shop Drawings

Inventory Control System

Drawings shall consist of equipment layout including assembly and installation details and electrical connection diagrams. Drawings shall include any information required to demonstrate that the system has been coordinated and will properly function as a unit and shall show equipment relationship to other parts of the work, including clearances required for operation and maintenance.

SD-07 Certificates

Field Training Schedule.

Proposed schedule for field training, at least 2 weeks prior to the start of related training.

Inventory Control System.

Where the system, components, or equipment are specified to comply with requirements of EPA, proof of such compliance shall be provided. The label or listing of the EPA shall be acceptable evidence. In lieu of the label or listing, a written certificate from an approved, nationally recognized testing organization equipped to perform such services, stating that the items have been tested and conform to the requirements and testing methods of the specified agency may be submitted.

SD-10 Operation and Maintenance Data

Operation and Maintenance Manuals

Six (6) copies of O&M Manuals shall be provided. The manuals shall include the manufacturer's name, model number, parts list, list of parts and tools that should be kept in stock by the owner for routine maintenance including the name of a local supplier, simplified wiring and controls diagrams, troubleshooting guide, and recommended service organization (including address and telephone number) for each item of equipment. Each service organization submitted shall be capable of providing 4 hour onsite response to a service call on an emergency basis.

PART 2 PRODUCTS

2.1 Console

The console shall be relocated from the existing Border Patrol Station located at the Northwest Corner of Blanco and Highway 180, Sierra Blanca Tx.

The console shall be wall mounted using external mounting tabs. The console shall be equipped with a two-line, 24-character liquid crystal display for on-site viewing of all inventory, leak detection and alarm information. The inventory control console shall be Veeder-Root Guardian Model no. 848690-100 or approved equal. The console shall be equipped with a front-panel keypad with control and alphanumeric functions for programming, operating and reporting functions. The console shall be equipped with three front-panel indicators to provide a visual indication of power on, warning and alarm conditions. The console shall be equipped with a back-up battery to maintain all programming information as well as inventory, leak detect and alarm information in the event of a power outage. The console shall provide 2 from C contact relays that provide the ability to enable an external audible/visual alarm or control external devices. The console shall be a fixed feature set design to address business management, leak detection and communications requirements. The console shall be equipped with conduit knockouts on the top and the bottom of the monitor for rigid conduit entry into the monitor. One conduit entry shall be designated for the intrinsically safe compartment, and two conduit entries (top and bottom) shall be designated for the high-power compartment. The console shall be separated into two compartments for: 1) intrinsically safe wiring and devices; 2) high-power waiting and devices. The console shall have an internal quick-disconnect connector for 120 VAC wiring to the console for ease of installation, service and troubleshooting. The console shall be equipped to communicate directly with an external PC. The system shall also have the ability to communicate with a remote device via the telephone lines. The console shall be equipped with internal audible and visual warning and alarm

indicators. The console shall be intrinsically safe, with Underwriter Laboratories (UL) approval. The console shall comply with FCC testing, FCC Part 68, Subpart 15. The console shall continuously monitor all probes and sensors, reporting not only normal operating conditions, but also system malfunctions or failures.

2.2 Probes

The probe shall be capable of utilizing standard non-shielded gas- and oil-resistant wire between 14 AWG and 18 AWG for field connections. The probes shall be a Veeder-Root Mag-2 Probe Model No. 847390-207 or approved equal. There shall be no more than two conductors between each probe and control console. The probe shall be compatible for aboveground tank installations. The probe shall use digital communications protocol format for maximum RF/EMF resistance immunity. The probe shall be certified to provide tank gauging accuracy to less than 0.2 GPH.

2.3 Sensors

The system shall provide the ability to monitor up to 8 interstitial areas and or containment areas utilizing a standard float style sensor.

2.3.1 Interstitial Sensor for Double-Wall Steel/Concrete Tanks

The interstitial sensor for a double wall steel tank shall fit into a riser pipe for a double-wall steel tank of 1.5 inch I.D. or greater. The steel interstitial sensor shall be equipped with a 25-foot leader cable to connect the sensor to field wiring in the sensor junction box. The sensor shall utilize a float and reed switch technology to sense and alarm for the presence of fluid. The sensor shall accurately sense the presence of hydrocarbons at operating temperatures from -13 degrees F to +158 degrees F.

2.4 PC-Based Management Software

The inventory management software is to be installed on the Contractor-supplied PC, specified in SECTION 11300 - AUTOMATED FUEL MANAGEMENT SYSTEM. The software shall be compatible for use with Windows 95. The software shall provide a graphical representation of tank levels and all alarm/warning conditions. The system shall provide preformatted reports for inventory control and regulatory compliance. Data shall be available to be transferred to any program accepting a flat ASCII file.

2.5 Communications

2.5.1 RS-232 Serial Communications Interface

The system shall have the capability to communicate directly with a computer. The system shall provide direct interface via a 25-pin D connector using standard RS-232 serial communications hand-shaking signals.

2.6 Electrical

Electrical Components and systems to be installed shall be as required in section 16011 - Electrical Work, General.

PART 3 EXECUTION

3.1 Interstitial Leak Detection

3.1.1 Dry Monitoring

The system shall be able to perform automatic, continuous leak sensing in the dry interstitial space of a double wall tank/piping, to detect a breach in the inner or outer shell. The system shall have the ability to sense the presence of hydrocarbons and/or fluid and provide an alarm for the worst case condition (fuel). The form factor of the sensor must provide for easy field installation/removal. The system shall have the ability to continuously monitor the integrity of the sensor for an open condition, alarm condition, or normal operation condition.

3.2 Environmental Compliance Reports

The system shall have the ability to provide a record of the last three occurrences of each type of alarm or warning condition detected by the system. The system shall provide the following types of reports related to environmental compliance matters:

1. System status messages
2. Liquid sensor warning and alarm messages
3. Normally-closed sensor warning and alarm conditions
4. High or low liquid level conditions
5. In-tank warning and alarm messages

6. External input messages
7. Software module alarm message

3.3 Product Inventory Control (Tank Gauging)

The tank management system shall collect product height and temperature data from up to two level proves and compute gross and temperature-compensated net gallons. The system shall provide inventory and delivery information to generate a complete set of printed inventory or delivery reports. The system shall automatically generate a inventory increase report when a delivery of product to a tank has taken place. The system shall have the ability to store up to the ten most recent inventory increases in memory. The system shall provide the ability to monitor aboveground storage tanks for inventory management.

3.4 Inventory Management Reports

The system shall monitor inventory in U.S. or Metric units for up to four tanks and produce a combination of automatic and manual reports for each tank, which include the following information:

1. Fuel volume
2. Fuel height
3. Water height
4. Fuel cost
5. Fuel temperature
6. Ullage
7. Temperature-compensated fuel volume
8. Last inventory increase amount
9. Time and date
10. Tank identification
11. Fuel type identification
12. 90% ullage

An inventory status report shall be generated and transmitted to the PC automatically three times a day with the information stored in memory or manually from the console input. The system shall transmit an automatic delivery report to the PC after each bulk delivery to a tank. The information shall include station header, product label, date, starting and ending volumes, temperature of the fuel as well as the net volume increase. The information shall be available in U.S. or Metric units.

3.5 Communications

The tank monitoring system shall provide the ability to communicate with locally attached electronic devices through an RS-232 port or remote locations via an RS-232 port. The system shall provide data in a display or packed computer data format. The communications protocol shall be compatible with the PC management software specified in Part 2. The tank monitoring system shall provide all reports through the PC management software. These shall include all reports associated with inventory management, environmental compliance and diagnostics/troubleshooting. The system shall provide for setup and configuration through the management software.

3.6 Input/Output Capabilities

3.6.1 Output Relay

The system shall provide the ability to enable the external audible/visual alarms or control external devices through a relay contact closure. The system shall provide 2 Form C contact relays. The system shall provide the ability to program the relay in either a Normally Open or Normally Closed orientation. The system shall provide the ability to assign sensor, or system alarm conditions to a select relay. The system shall provide the ability to designate a 20 character label to a device connected to the output relay through system programming.

3.6.2 Input Interface

The system shall provide the ability to accept an input from a external device and enable a relay to control an external device. The system shall have the ability to define the type of input connected to the system. The system shall have the ability to name, through systems programming, each external device connected to an input position.

3.7 ELECTRICAL WORK

The Inventory Control System has components that require electrical connections. The central control console, the tank interstitial monitor(s), (one in each tank), the in-tank level monitoring probe(s), (one in each tank), the overflow alarm and the acknowledgement switch. The electrical connections required for power and control to each of these units are given below. The Contractor shall provide and make all

electrical connections for the Inventory Control System.

3.7.1 POWER

3.7.1.1 Central Control Console

A 120 Volt (approx. 1 amp) power circuit shall be installed for the central control console. The circuit shall be from the new power panel, which is required in SECTION 16011 - ELECTRICAL WORK, GENERAL, to the console and shall be hard wired to the console. The location of the console shall be approved by the Contracting Officer. A 1/2" EMT conduit, w/ 4 # 12 THWN Cu. (3 # 12 for the hot, neutral, and ground and the forth wire for a separate and independent ground) shall be installed.

3.7.1.2 Overfill Alarm and Alarm Acknowledgement Switch

A 120 Volt power circuit (3 # 12 THWN Cu.) shall be routed to the Overfill Alarm Acknowledgement Switch. Power for this circuit may be obtained from the new circuit being installed above for the PC. The power circuit shall be run in a 3/4" power conduit from the new power panel (or the receptacle required above) to the Acknowledgement Switch. Within 20 ft. of the tank assembly, the conduit shall be RGS and Class I, Division 2 installation per NEC Art. 501. All other buried conduit shall be Sch. 40 PVC. The conduit shall be RGS in above ground, exterior locations, and EMT in above ground, interior locations.

3.7.2 CONTROL/INSTRUMENTATION

3.7.2.1 In-tank level monitoring probe(s)

An RGS junction box shall be installed within 2 ft. of the tank level riser pipe containing the level probe (one on each tank). A 3/4" RGS conduit w/2#14 THWN Cu. shall be run from the junction box to the Central Control Console and a 3/4" RGS conduit from the junction box to the housing of the level probe. The level probe lead wires shall be connected to the 2#14 THWN in the junction box.

The conduit from the level probe through the JB and on to the Control Console shall be continuous RGS and bonded throughout (for electrical shielding).

Within 20 ft. of the tank assembly, the RGS conduit including the junction box shall be a Class I, Division 2 installation per NEC Art. 501.

3.7.2.2 Tank Interstitial Monitor(s)

An RGS junction box shall be installed within 2 ft. of the tank interstitial monitor access port/riser pipe containing the monitor (one on each tank). A 3/4" RGS conduit w/2#14 THWN Cu. shall run from the junction box to the Central Control Console, and a 3/4" RGS conduit from the junction box to the housing of the monitor. The monitor lead wires shall be connected to the 2#14 THWN in the junction box.

The conduit from the monitor through the JB and on to the Control Console shall be continuous RGS and bonded throughout (for electrical shielding).

Within 20 ft. of the tank assembly, the RGS conduit including the junction box shall be a Class I, Division 2 installation per NEC Art. 501.

3.7.2.3 Control/Instrumentation Conduit

The control/instrumentation circuits for the level probes and the interstitial monitors for the tanks may be installed together in one conduit. Where more than one circuit is installed the conduit size must be increased to a minimum of 1" RGS.

3.7.2.4 Overfill Alarm Acknowledgement Switch

Control wiring (or fiber optic cable) and connections from the Overfill Alarm Acknowledgement Switch to the Central Control Console shall be per the manufacturer's requirements. Within 20 ft. of the tank assembly, the RGS conduit shall be a Class I, Division 2 installation per NEC Art. 501. All other below ground conduit shall be Sch. 40 PVC. Above ground exterior conduit shall be RGS, and above ground interior conduit shall be EMT. Note: This circuit may be installed in the power conduit required above.

3.7.2.5 Overfill Alarm

Control wiring (or fiber optic cable) and connections from the Overfill Alarm to the Overfill Alarm Acknowledgement Switch shall be per the manufacturer's requirements. Within 20 ft. of the tank assembly, the RGS conduit shall be a Class I, Division 2 installation per NEC Art. 501. All other below ground it shall be Sch. 40 PVC. Above ground exterior conduit shall be RGS, and above ground interior conduit shall be EMT.

3.8 Alarms

The tank monitoring system shall provide an audible and visual indication of all system, interstitial leak, and external sensor alarm conditions. The system alarm conditions shall include:

1. Maximum product level
2. High product level limit
3. Overfill alarm
4. High water alarm
5. Low product level limit

The tank monitoring system shall provide an audible and visual alarm indication for external sensor leak failures (fuel, water, sensor out). In conjunction with providing and audible and visual alarm, the system shall transmit all alarm conditions to the PC management software. The system shall have the ability to transmit the alarm condition immediately or program a delay time before sending. The system shall also have the ability to enter a repeat function in the programming to repeat sending the alarm condition. The system shall provide the operator with the ability to disable the audible portion of an alarm but the visual alarm shall not be disabled until the alarm condition has been corrected. The system shall be equipped with an external audible and visual alarm with acknowledgement switch. The external alarm box and acknowledgement switch shall be manufactured in a watertight gasketed enclosure for installation in an outdoor environment. The external alarm box and acknowledgement switch shall interface to the tank monitoring system via an internal relay. The system shall have the ability to store up to three alarm occurrences in memory.

3.9 Setup (Startup/Installation)

The system shall contain parameter-driven software to adapt the tank monitor to site specifications. The parameters must be enterable in assigned fields at the time of system startup. In addition, the parameters must be field updatable so that changes in tank diameter/dimensions as well as site specifications can be added. The system shall provide the use of a security code to prohibit unauthorized entry to the systems set-up parameters. The system security code shall be a six-digit number entered through the front-panel keyboard or through the external communications interface. The security code shall have the capability of containing alpha or numeric characters. A four-line, 24-character custom location header to identify the site must be user-programmable. The header must appear automatically on inventory status reports, leak detection reports and automatic delivery reports each time they are printed. Set-up parameters shall include the following:

1. System setup data
2. Communications setup data
3. In-tank setup data
4. Liquid sensor setup data
5. External sensor setup data
6. Output relay setup data

3.10 Diagnostics/Troubleshooting

All diagnostic information shall be generated by the system itself. The system shall not allow the user to change or enter diagnostic information in any way. The following diagnostic information shall be included in the system:

1. Probe diagnostics
 - a. Probe type
 - b. Serial number
 - c. Probe length
 - d. Dry and wet calibration values
2. System diagnostics
 - a. Software revision level
 - b. Software part number
 - c. Software creation date
3. In-tank diagnostics
4. Liquid sensor diagnostics
5. Alarm history report

3.11 Reports

All diagnostic information shall be transmitted to the PC management software documentation and historical record keeping.

3.12 Start-up and Commissioning

The inventory control system shall be commissioned by an authorized manufacturers representative. The startup and commissioning shall consist of installation checkout, operation checkout and customer training on use of the equipment. The manufacturer shall supply a Warranty Registration and Checkout Form to properly document the site information to include:

1. Installation location
2. Installer
3. Equipment identification
4. Tank information
5. Leak detector information
6. Start up distributor information
7. Customer approval

3.13 Installer's Training Requirements

The manufacturer shall require and provide mandatory certification training for all of its authorized distributors and service contractors/installers. The certification program shall consist of three certification levels covering installation, setup/operation, and service/trouble shooting of the manufacturer's UST monitoring systems. The manufacturer shall provide certification information on contractor/installer to regulatory agencies that require certification documentation. The manufacturer shall offer recertification training to keep contractors/installers current with updated information. The manufacturer shall conduct regional training seminars throughout North America. The manufacturer shall provide a home study certification program for installing contractors.

- - o 0 o - -

-- End of Section --